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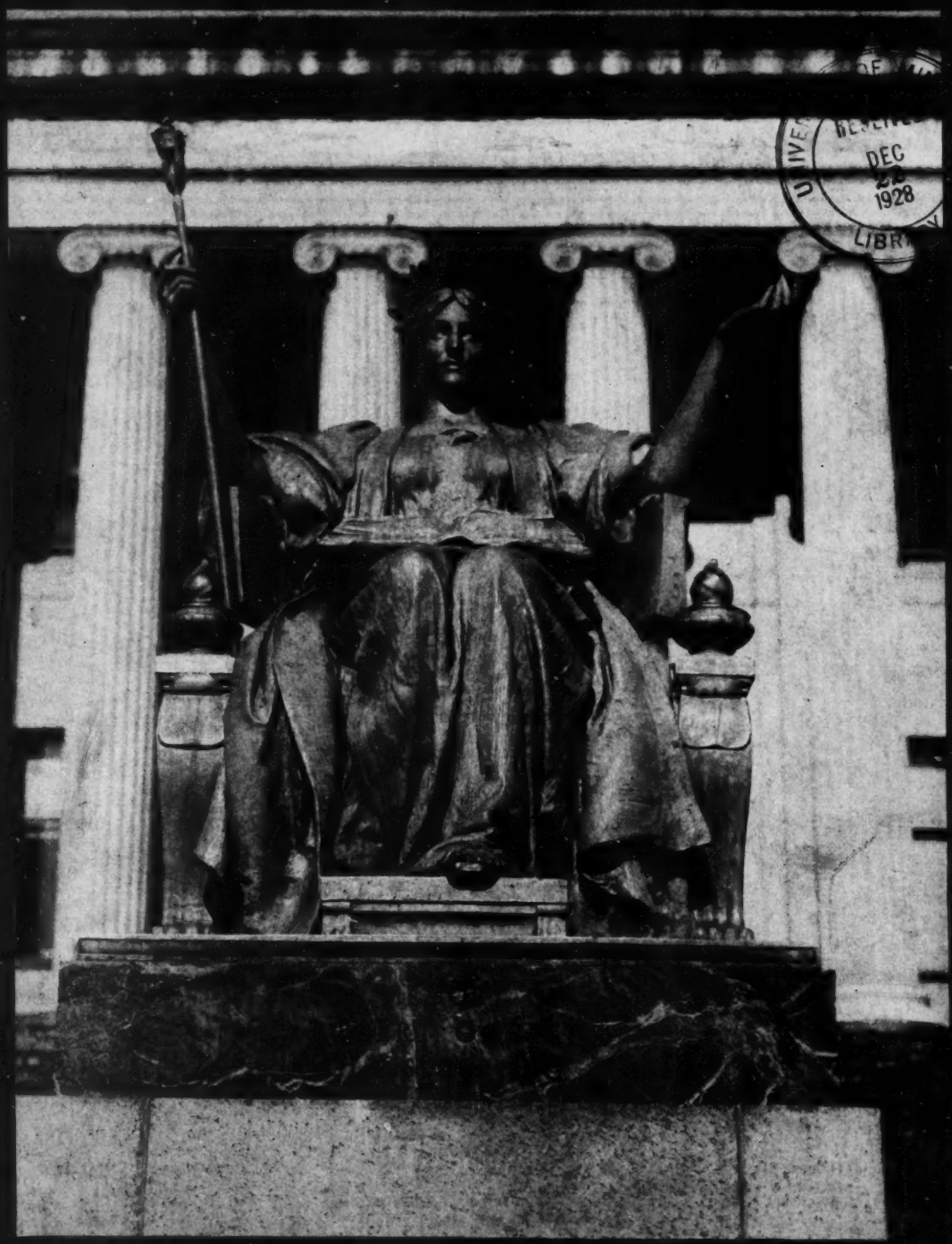

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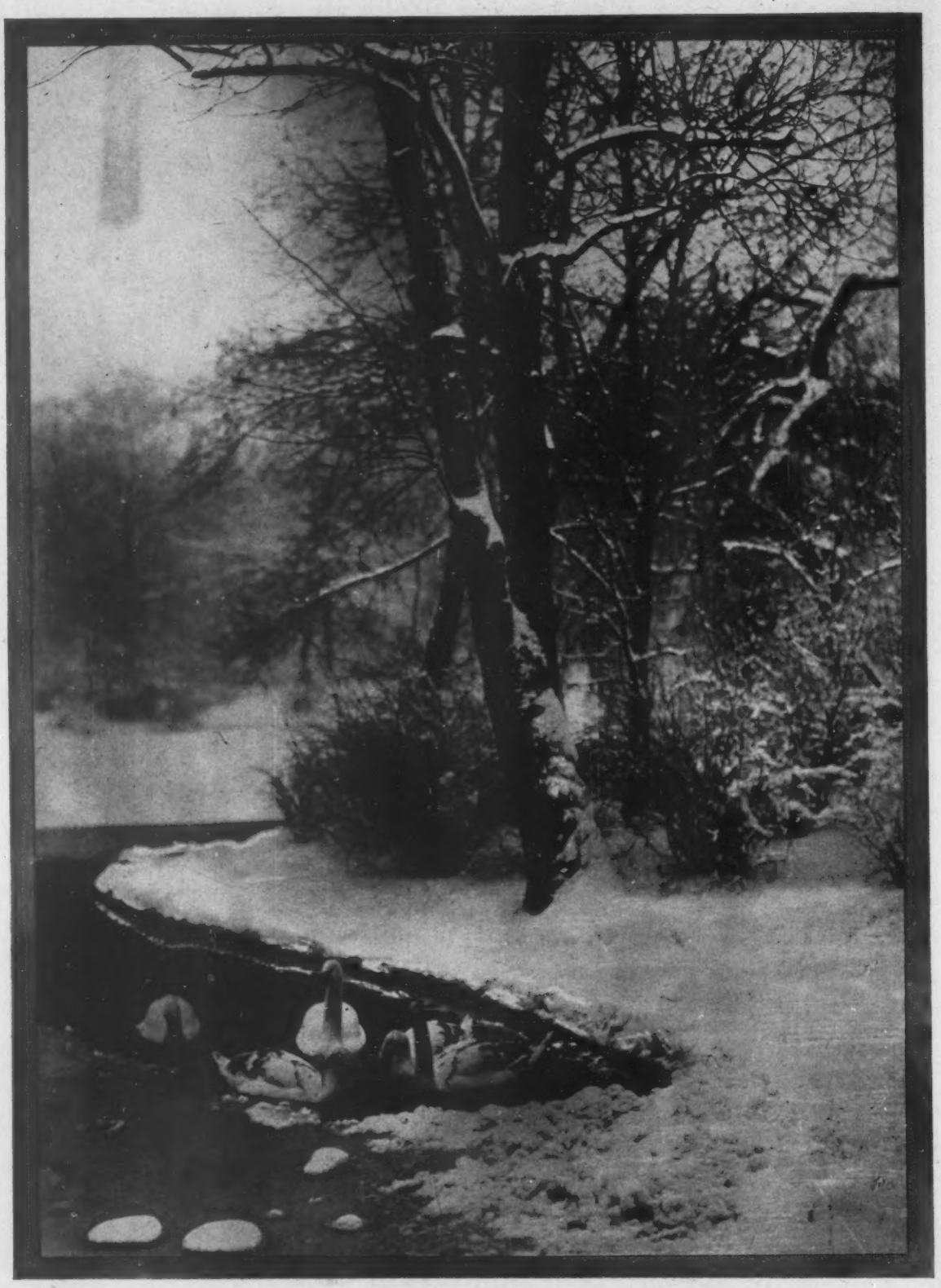

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"ALL ON A CHRISTMAS MORNING"

Photo by P. & A.

Some of the Most Valuable of All Work Done By the Government Emanates From the Bureau of Standards at Washington

Gauging Severity of Building Fires

Means Which Have Been Used to Determine Temperatures Attained in Flaming Property and Conclusions as to the Relation of Construction to Disaster

By S. H. INGBERG

U. S. Bureau of Standards

From An Address Delivered Before The National Fire Waste Council at the September, 1928 Meeting of the Chamber of Commerce of the United States in Washington, D. C.

SEVERE fires, earthquakes, storms, floods and similar devastating manifestations of the elements tend to create the impression of being so overwhelming and irresistible that no human effort can prevent or greatly lessen their dire effects. It is only when examined in detail that the ruins give information of even a qualitative nature as to the severity of the agents concerned. Thus, in the case of fires, fused metals have given indications of temperatures although no clue as to the length of time they prevailed. Fire effects on buildings, materials, constructions and devices also give some information, particularly if their performance in a controlled fire test is known. The effect of a fire is generally more dependent on the duration of high temperatures than their intensity and on this point fire reports and fire ruins give little information. The fire department records give the time when a company leaves its station and when it returns. The firemen being actively engaged in fighting the fire cannot be expected to be able to give much technical detail as to its severity. In the case of the Burlington Building fire in Chicago of March 16, 1922, beside inspecting the building a few days after the fire, an attempt was made to obtain from fire department and railroad officials estimates of the general duration of flaming and high temperatures. Here was a case where the time the fire entered the building was fairly well known since it was the last building in the group burned that was attacked. Firemen within the building were fighting the fire throughout its progress and followed it through the different stories that were burnt out, as soon as entrance was possible. In spite of these favorable conditions for observation the estimates made of the effective duration of the fire as it concerned a significant portion of a building story varied from one hour to four hours, the figures appearing the most reasonable being based on evidence from the fire ruins rather than on observation of the fire. Samples of fused metals collected from the ruins were found to have melting points from 670 to 1195°C (1238 to 2165°F), the highest obtaining for a piece of cast iron from a typewriter frame. Brass handles of metal filing cabinets having melting range from 930 to 940°C (1706 to 1724°F) were generally found melted where the fire had con-

sumed completely the combustible room contents, and less frequently their copper index plates, the melting point of which was found to be near 1065°C (1949°F). Observations of the fire effect on wire glass and on structural members and protections gave some further information but at the best the evidence concerning the significant duration of this well observed and much discussed fire was meager and inconclusive.

THE fire resistance of building materials, constructions and devices is gauged by ability to meet the requirements of the standard furnace test. The exposing condition for all of them is produced by a furnace fire regulated so that the average furnace temperature, as measured within pyrometer mountings of given material and size, will be at or near specified points at given periods after the start of the test. The ultimate fire resistance is then gauged in terms of the time that constructions, such as bearing walls and floors, exposed to the test fire on one side, will support load and prevent the occurrence of temperatures on the other side that might cause ignition of combustible materials. Columns exposed to the test fire on all sides are similarly rated on the length of time they will support a load comparable with what they carry in a building. Non-bearing partitions and finishes are rated on the time protection is afforded material on the unexposed side and safes on the time full legibility of the contents is maintained, the limit of performance being stated, for the sake of definiteness, in terms of certain maximum temperatures or temperature rises permissible on the unexposed side or within the protections.

By means of fire tests conducted according to the above procedure the fire resistance of a considerable range of building material and constructions has been determined and with the continuance of these tests most of those in common use will be thus classified. The procedure also offers a ready means by which the fire resistive merits of a new material, construction or device can be determined.

In order to apply the results of such tests in the construction and equipment of buildings with the proper degree of safety and economy, it is necessary to be able to make reliable estimates of the severity of fires that can arise with typical constructions and occupancies involving given amounts of combustible materials per unit of floor area. A building or a given portion thereof may or may not be involved in a fire in its lifetime and provisions for safety to life within and near the building and protection to adjacent and neighboring property should be required only with particular reference to the building type and size proposed to erect and the occupancy it is intended to house. With requirements uniform for all occupancies more than the needed protection would be likely to be provided in connection with the occupancies housing the less severe hazards and not enough for those with the greater amounts of combustible contents.

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EXPECTED fire severity for a given case would have to be interpreted as being equivalent to a period of exposure to the furnace test described above since the fire resistance of the protection to be applied is measured in this unit. The difficulty encountered in attempting to obtain this information from observation of fires and fire ruins led to considerations of the possibility of conducting burning-out tests in suitably designed structures with contents arranged to duplicate typical occupancies. Two such structures have been built on our grounds, one 15 by 29 feet inside, and the other 30 by 60 feet, both one story in height and of fire resistive construction, the larger building being provided with a roof monitor over the center section to provide opportunity for draft conditions such as might be caused by an open stair or elevator shaft. A number of tests with office and record storage occupancies have been made in these buildings, both with cement and wood finish floors. The fire was given either a slow start as from a burning waste paper basket, or what we term as exposure start, produced by burning a quantity of readily combustible materials in one corner of the room. Wall shutters were operated to give the air supply deemed necessary to produce the severest fire condition and temperatures were measured at several points at three or more levels, using pyrometers of the type employed in controlling the severity of the furnace tests. In the tests with wood desks, tables and filing cabinets, the combustible contents and trim assumed uniformly distributed, ranged from 13.1 to 20.6 pounds per square foot, and the equivalent fire durations from a little over one hour to about two hours of the standard furnace test. With metal desks and filing cabinets the severity of the fire and readiness with which it spread was considerably reduced, the equivalent duration with wood top floor and exposure start for the fire being about one-half hour. A little over one-half of the paper records were exposed on top of desks or in open drawers and cabinets. With the cement finish floor and exposure start for the fire, the equivalent fire duration with the same furniture and weight of paper contents was about 10 minutes.

While the 20 pounds per square foot combustible content represents near the maximum obtaining where the space is used for ordinary office purposes, portions of the same buildings are often used for library and record storage purposes. To gauge the severity of the fire from such concentrations, tests were conducted with records on wood shelving giving combustible contents assumed uniformly distributed, from 44 to 55.4 pounds per square foot. The equivalent fire durations ranged from 5 to about 8 hours, the values arrived at being dependent somewhat on the basis of comparison used. On any basis of interpretation, the severity of the fires from these concentrations would be considerably higher than that for which office buildings are generally designed and if covering areas equal to one floor bay or more and located anywhere within the building, the whole interior structural protection provided would have to take such heavy concentrations into account.

This prompted inquiry into methods whereby the hazard can be reduced which led to tests with metal shelving. The same amount of records were involved (48.5 pounds per square foot) as in a previous test

(Continued on Page 28)

Little-Known Casualty Coverages

Important Risks Which Are Often Overlooked Because of the Volume of Other Business Which Obscures Them

By AVARD L. BISHOP
Professor of Business Administration
Yale University

CASUALTY insurance includes a goodly share of all forms of insurance other than life, marine, and fire. There are numerous forms of coverage involved, inasmuch as casualty insurance embraces practically all types of insurance concerned with accidents to persons or to property. Nor is this statement of the field of casualty insurance sufficiently inclusive for it embraces health insurance, forgery and check alteration, burglary and robbery insurance, and numerous other lines as well.

If one will stop to reflect for a few minutes upon the possible range of accidents to individuals and to property he cannot fail to be impressed with the tremendous scope of the accident field. It embraces persons in civil, professional, and business life, including all classes of individuals from those holding the highest executive positions at the one extreme to the common day laborer at the other. It embraces accidents to male and female; to children; to adults, and the aged; it applies to all walks of life and in all places including the home, on the streets and public highways, in places of amusement, in industrial plants, in transportation by land, water, and air, and in commerce as well. It includes accidents to practically every known type of property regardless of its location or ownership. Surely, the field of insurance dealing with accident hazards is both broad and comprehensive.

One may say with considerable assurance that the best known types of casualty insurance, so far as the public is concerned, are personal accident, liability, workman's compensation, and automobile insurance. There are, however, many other forms of casualty insurance equally as important as these from the standpoint of society, more particularly from the standpoint of certain classes of property owners. It is the purpose of this article to discuss briefly certain forms of these less-well-known, though highly necessary, forms of casualty coverage. The first of these to receive attention will be water damage insurance.

Water Damage Insurance

THIS is a form of coverage regarding which the general property-owning public seems to be lacking both in specific knowledge of its nature and in appreciation of the coverage offered. At the outset, it should be said that water damage insurance does *not* apply to the damage to property incurred as the result of a fire department using water to check a fire. The ordinary fire insurance policy gives ample protection to the owners of property which is damaged by water when a fire has taken place. Let us expand this idea a little, so there will be no confusion on this point.

The legal interpretation of the expression "direct loss and damage by fire" in the standard fire insurance policy has been declared sufficiently comprehensive to make it clear and conclusive that the fire insurance companies covering the owner of a risk which has had a fire are liable not only for compensating for loss of property which has actually been ignited and damaged or destroyed, but

Photo by P. & A.

Water May Put Out Fire But It Also May Destroy a Great Amount of Very Valuable Merchandise in the Process

also for property not reached by the fire, but which has been injured or damaged by the water used in putting out the fire or bringing it under control. This rule applies not only to the property in the risk that is burned but also to that in neighboring apartments or buildings. All such damage attributable directly to the fire is covered by the standard fire insurance policy without any extra endorsement; it has nothing whatsoever to do with the casualty type of water-damage insurance which is now to be discussed. The latter is likely to have no connection with a fire. Such being the case, let us endeavor to see exactly what the field of water damage insurance embraces.

Strictly speaking, water damage insurance covers such casualties as damage to property caused by leaky roofs; open or broken windows; defective skylights; clogged gutters and leaders; leakage from steam and hot water pipes or radiators; the overflowing of wash basins or bath tubs caused by carelessness of children, servants or adult members of the household; broken, defective, or improperly-connected water pipes; and so on. In brief, the field of water damage insurance is indeed both broad and varied.

From the standpoint of the casualty insurance companies, there are, of course, certain undesirable or prohibitive risks, as is the case in virtually all fields of insurance. Nevertheless, practically every dwelling house, hotel or apartment house, structure, may be covered with water office building, or general mercantile damage insurance, if the owners so desire. The number of prospects, therefore, in this branch of underwriting is literally legion. Certain companies have adopted, for the purpose of water damage insurance, a three-fold classification of risks, as follows: private dwelling houses; apartments or flats; hotels, schools, churches, public and mercantile buildings. The damage by water to risks in each one of the three classes mentioned above occurs with sufficient frequency and regularity to make it possible for such risks to be the proper subject of insurance; and there are indications that the owners of such properties are waking up to the necessity of shifting the risk of water damage to insurance companies, inasmuch as the cost of coverage is relatively small.

ANYONE who has seen the damage that has been done to property by water, along the lines mentioned above, could not fail to be impressed with the need of water damage insurance. The complete redecoration of one or more rooms of a house that has suffered water damage and the replacement or repair of the furnishings soon runs into a bill of considerable size. Most householders are aware of the high prices, nowadays, of the labor involved in redecoration and of the cost of household furniture, draperies, rugs and other necessary furnishings. Fur coats, ladies' and men's evening garments, and clothing in general, are not exempt from such damage, and every person is aware that the cost of replacing these articles may soon run into a very substantial amount. The fact is, in brief, that if water leakage occurs in any dwelling house, the damage done may soon represent a very large sum unless the leakage is quickly detected and remedied. For one reason or another such accident frequently happens when the house is either temporarily closed or, when the family is out, so that early detection of the trouble is by no means certain.

A form of water damage that is particularly destructive to property, and which frequently happens when a building chances to be closed for some months during a rainy season, is that caused by leaves or dirt clogging the gutters and leaders on a building. This may cause water to accumulate in considerable amount, inasmuch as it cannot be carried off through normal channels. It backs up and stands on roofs and porches where it was not intended to be allowed to remain, and frequently this water seeps through the side walls or comes through into the building around the flashings or through the roof. Cases have been known where much of the interior of a building has had to be redecorated, the floors refinished, the furniture done over, the draperies replaced, and practically everything else replaced or renovated, as a result of clogged gutters and leaders.

Such damage may be going on within a closed dwelling, or other type of building, for days and weeks without the passer-by suspecting that anything is wrong inside. One of the worst cases of water-damage that has come under our observation happened to a dwelling during a rainy summer. The house was closed, the family having gone abroad for the summer. There had been several opportunities to rent the house for the season, but as it had recently been redecorated, and was in splendid condition inside, not one of the applicants for renting the house seemed a sufficiently desirable family to admit to the premises for fear something might happen to the interior. When the family returned in the fall and entered their house, they found several rooms completely wrecked or ruined, due to the entering of water from the roof and from clogged gutters.

IT IS hardly necessary to comment extensively upon the potential possibilities of water damage as a result of the disorders with or accidents to the plumbing system in a residence or many other types of modern buildings. It requires only a slight stretch of the imagination for one to draw a comprehensive mental picture embracing the conveyors and holders of water in the plumbing arrangements. The hazards involved are numerous. Water is carried through the walls or between the partitions in many parts of the building, and it is ever present in these pipes and subject to considerable pressure. Moreover, the pipes have numerous joints, so that there are numerous possibilities for the discharge of water at the joints or couplings. If, by chance, the pipe should prove defective or if it should burst from other causes than a defect, great possibilities of damage are involved. It is quite easy for children and adults as well to leave wash basins or bath tubs, after use, in a condition so that they will immediately fill with water, and overflow. The damage that can be done to the property in the bath room and in the rooms on the floors below from this possibility, attributable, if you will, to the frailty of human nature, is very considerable. Again, in cold weather the water in pipes in certain less-well-protected parts of the building may become frozen and, later, burst with disastrous results. Failure to drain properly the water in the pipes or from heating systems before a building is being vacated, particularly in cold weather, is an additional cause of frequent damage to property by water.

It would be possible to discourse at considerable length upon the potential hazards to property that might result in damage within the scope of water damage insurance. Cases of loss adjustment have been reported on mercantile risks which amount to several thousands of dollars. Even in private dwellings, losses sometimes are for considerable sums. In brief, the possibilities of a building and its contents being damaged by water because of rain and snow entering windows and skylights; by seepage through the walls; from frost; from

Photo by P. & A.

Here Again Water Seems To Be Playing a Large Part In Completing Destruction

leaky radiators or heating pipes; and from the numerous other agencies, are difficult to exaggerate.

Water damage coverage for residences is sold by certain casualty insurance companies either separately or combined with other residence coverages, comprising, in such cases, a comprehensive or blanket residence policy. This may be written to include burglary, theft and larceny; water damage; repairs and replacement to the plumbing and heating systems, if the damage is directly attributable to discharge, leakage, or inflow of water; public liability; employers' liability; glass breakage; automobile and aircraft damage to the premises; loss of use; and possibly other items.

Sprinkler Leakage Insurance

SPRINKLER leakage insurance is designed to indemnify the insured for loss or damage resulting from water leaking from automatic sprinkler equipment, together with tanks and connections therewith. This form of coverage is often extended for little or no extra charge to include loss or damage resulting from the collapse of sprinkler tanks.

It seems desirable at the outset to summarize briefly a few facts in the historical development of this form of coverage. A story that is current among the casualty insurance fraternity connects the invention of the automatic sprinkler with an incident which is said to have happened years ago during a certain fire. Just when this fire occured or the exact year of its occurrence we do not know, but this is how the story runs. Within the burning building were lead water pipes. The heat from the fire melted a pipe in a fortunate location with respect to the place of the fire, and the water that was forced through the apperture, it is said, put out the fire. Whether the story is true or not, it is a plausible explanation for the beginning of a series of developments resulting ultimately in the automatic sprinkler. About the middle of the nineteenth century, there was first installed in certain mills in this country a system of fire protection represented by the perforated pipe. These pipes having holes made in them at certain intervals were run along the ceilings, and when a fire took place water was turned into the system and was discharged through the holes, presumably upon the burning property. This was a considerable step in advance of the melted water pipe, but much still remained to be accomplished in the evolution of the sprinkler apparatus.

LATER on, improvements were made from time to time, until finally an automatic sprinkler system evolved whereby the heat of the fire opened holes in the pipes from which water was discharged upon the fire. Great improvements still had to be made, however, before the various types of automatic sprinklers were certain to go into action when a fire occurred in the premises. Ultimately, the great problem was to arrange the installation so as to be sure that the sprinklers would not become active when no fire had taken place. Apparently this problem has been pretty well, though not completely, solved. The insurance companies granting sprinkler leakage insurance soon came to limit their coverage to buildings and contents where automatic sprinklers of an approved type had been installed.

It is a common misconception of the layman, who knows very little, of course, about this form of insurance, that sprinkler leakage results, in most

cases, from the automatic sprinklers becoming active either under normal temperature conditions within the building or when the heat becomes too great. As a matter of fact, it is reported upon good authority that something like three-fourths of all sprinkler leakage losses result from the freezing of sprinkler pipes. This is because a part of the installation may be in a poorly-heated section of the building or it may be in one or more rooms temporarily not in use and, therefore, not sufficiently heated. Great care is necessary, particularly over the week-ends and on holidays, that nothing happens to permit the freezing of the sprinkler system. Under normal or proper temperature conditions in the building in any season of the year the vibration caused by heavy machinery in motion is a possible cause of the sprinklers becoming active, also certain manufacturing processes may corrode parts of the sprinklers and interefere with their normal functioning, so it is said.

It was not until the automatic sprinkler device for coping with the fire hazard in factories had been well perfected, that insurance companies became interested in making contracts for granting indemnity for water damage caused by the accidental discharge of water from sprinkler installations. Many changes and adjustments were necessary from time to time to adopt the form of coverage to the needs of the purchasers. At the present time, the policy, speaking generally, grants indemnity for loss or damage to the insured's own property when such loss or damage is attributable to the accidental leakage or flow of water from the installed sprinkler system. The policy includes coverage for practically all causes of such leakage, although the insurer ordinarily is exempt from liability when the cause is fire, explosion, the collapse of the building having the installation, earthquake, riot, war, and a few other conditions. It also should be noted that the coverage under certain circumstances applies to the property of others than the owners, such as goods held for sale on commission, or in trust, or even goods already sold but not removed from the premises.

Power Plant Insurance

POWER plant insurance is a general term for over forty different varieties of coverage connected with accidents to power plants of various types. More specifically, it embraces insurance covering accidents to electrical machinery, steam boilers, flywheels, and steam turbines. Electrical current interruption insurance also is included in the list. Attention now will be given a few of these forms of coverage.

Electrical Machinery Insurance

THIS is, of course, a relatively new form of insurance, having developed only since the great strides in the electrical industry forced a demand for this branch of insurance. When it is recalled that the electrical industry was for the first time reported as a separate industry in the Census of 1879, and that the electrical industry received its great development within the memory of those who are still in the prime of life, the rela-

tive youth of electrical machinery insurance may readily be appreciated.

Electrical machinery insurance is a coverage primarily of two important hazards in connection with the use of electrical machinery, namely, "breakdown" and "electrical burnout." Ten years ago, the investment in control station electrical equipment and in that of electrical railways totalled about $3,000,000,000, to this should be added the investment in industrial electrical equipment in order to get a more complete picture of the extent of electrical machinery development at that time. Within the last ten years the increase in all these lines has been tremendous. Nor should we overlook that electrical equipment insurance is not limited to the three fields already mentioned; for electrical equipment is now found in an extensive list of occupancies including among others office buildings, hotels, amusement resorts, and theatres. Consequently, the field for expansion for this form of coverage is great.

Inasmuch as electrical machinery insurance is rather technical in character, no attempt will be made to go into details. The two hazards ("breakdown" and "electrical burnout") insured against are defined, in a policy form before us, as follows: "The sudden, substantial and accidental breaking or burning-out of the machine or any part thereof while in use or installed and connected ready for use, which immediately stops the functions of the machine and which necessitates repair or replacement before its functions may be restored." The policy coverage is designed to indemnify for direct loss for such an accident.

SOMETIMES this form of insurance is extended, for a small additional premium, so as to include injuries to others than the employees, and, if the compensation laws allow, to the insured's own employees. Moreover, it should not be overlooked that the coverage may be further extended to cover the use and occupancy hazard. This is not included in the regular policy, but may be added by way of endorsement. Sometimes it takes a long time to make the repairs to the electrical apparatus, during which time there is necessitated a shut-down of the plant, often causing a considerable loss to the owners. This loss of use of the plant and the overhead charges, etc., are covered in the use and occupancy endorsement, and farseeing executives are waking up to the necessity of securing this coverage, just as the buyers of fire insurance are beginning to ask for the addition of the use and occupancy rider to their fire insurance policies.

Various factors determine the selection of risks for electrical machinery insurance, many of which are highly technical. There must be a careful inspection of the plant and of the electrical installation and a study made of many factors. After the risk has been taken by the casualty insurance company, an inspection service by competent technically-trained men is arranged for to be made at the necessary intervals.

Steam Boiler Insurance

ANOTHER important branch of Power Plant Insurance is that pertaining to accidents to steam boilers. Among the first, if not the first, company to issue steam boiler insurance policies was the Steam Boiler Assurance Company of Manchester, England; this was in the early part of the second half of the nineteenth century. Other companies were soon formed in England for the same purpose, and the movement

(Continued on Page 29)

Beyond the Welter of Clanging Fire-Fighting Equipment and the Spectacle of Courageous Onslaughts of Fearless Men In Their Battle Against the Flames There Is An Interesting Aftermath, Not Seen By the Public, When Experts Figure Up the Amount of Loss

Photo by P. & A.

Fire Insurance Adjusting

Difficulties Encountered by the Man Whose Business it is to Estimate the Damage

By A. T. PERSSON
of Chicago, Illinois

From an Address Delivered at the Recent Mutual Convention in Milwaukee

SECOND SECTION

BY AND large, however, the underwriting side of insurance is very well done and, which is more important, it is constantly improving. In the fifteen years during which I have been adjusting losses it has been my pleasure to witness a tremendous advancement along this line. Doubtless there will always be unfortunate underwriting, and so long as this happens there will be need for the very high grade adjuster. When underwriting becomes more nearly perfect, the adjustment business will lose much of its peculiar fascination.

There is at the present time more and more of a tendency to insure betterments and improvements to a building not owned by the assured (but in which he is a tenant) under a contents form. The wording very often is somewhat as follows: "It is understood and agreed that insofar as this insurance relates to betterments and improvements of the building, the intention of this insurance is to indemnify the assured (lessee) for loss or damage to betterments and improvements notwithstanding such improvements and betterments may be or become a part of the building, and irrespective of any insurance thereon." The lease contains a cancellation clause in the event the building is so damaged or destroyed that it cannot be repaired within thirty days of the date of the fire.

The tenant insists upon collecting for the loss to betterments and improvements under the contents policies. He advances the argument that he paid a premium for such insurance. By reason of the fire he is out of business and is entitled to be reimbursed for the loss to his investment. The owner of the building insists upon collecting for the improvements for the reason they become a part of and are attached to the building. He insists that he rented the premises at a rate having in mind the fact that upon expiration of the lease such betterments and improvements would become his property.

A PROBLEM such as this is at times difficult. Certainly it is not fair to pay the same loss to two different people under two sets of policies. Very often the problem can be solved by the adjuster representing the building insurance and the adjuster representing the contents insurance agreeing to assume under each set of policies a portion of the loss. Sometimes,

however, it is not possible to do this. A tenant often has reasons why he does not wish to continue in business, the owner of the building does not have in mind putting his building back in its same condition before the fire. The neighborhood has changed, he wants to build a more elaborate building, or he does not wish to invest any considerable amount of money at this time for the reason the neighborhood is beginning to change and he does not know what will be the ultimate outcome.

In underwriting risks such as this it would appear that sometimes too little attention is paid to the existing conditions, to the conditions of the lease, and such matters.

A present day problem in the adjustment of losses is the question of when, and when not, to take over salvage to be conditioned for the account of the insurance company. Unquestionably there is more salvage taken from the assured than there should be. In most instances the assured should be in better position to handle salvage than anyone else, and taking it over involves expenses which can never be recovered in its sale.

Let us look at the matter from the salvage company's operation. The salvage company has customers who are accustomed to purchase salvaged material at reduced prices and they are interested in nothing but salvaged material. If the adjuster sends to the salvage company merchandise which is 100% perfect, the salvage company cannot hope to realize what such merchandise would be worth for the reason their outlet is for salvaged merchandise, their customers buy salvaged merchandise, and when they do they expect to get it at salvage prices.

Of course, there are a great many losses where the salvaging operation is necessary. For example, a stock of merchandise is thoroughly soaked and saturated, it needs conditioning and drying to keep it from mildewing and deteriorating. The assured is in no position to handle the stock—the salvage company is. They have their driers, they have the room and the proper accommodations. They have men who are accustomed to the handling of merchandise under such circumstances, and who know what care and attention to give it in order to produce the best results. A building, for example, is thoroughly gutted, the remaining salvage falls into the basement and it is necessary to wreck it before the salvage can be removed. This the salvage company can do. They are equipped for just such emergencies. The assured is not, and, therefore, the problem of when, and when not, to take over salvage for account of insurance companies is one which requires careful thought and consideration from all angles.

YET another problem which requires great delicacy and care is that of the employment of experts—to know when, and where,

and what outside assistance should be used in the adjustment of a loss. It must be remembered that the adjuster entering into the adjustment of any loss, at the best of it, can only hope to learn from conditions as he finds them in a very short period of time, a very limited portion of what his assured knows about his own particular line of business. It is the assured's business, and if the concern is successfully and ably managed, no one has the knowledge of that business, and no one can gain the knowledge of that particular business that the assured already has. If the assured is inclined to be fair and reasonable he can better than anyone else give the adjuster help and assistance in the adjustment of that particular loss. The problem is to know and to feel before entering into the adjustment of the loss when and where this condition will exist. The adjuster must be able to tell very shortly whether he can expect such cooperation. If the assured is not so inclined, the adjuster must know, and be constantly in touch with men in similar businesses who will and can give him the desired information.

There are times when the employment of experts to assist in the adjustment of a loss is not only an unnecessary expense, but will to such an extent aggravate the assured that eventually the loss, rather than being minimized by such action, will be increased by reason of losing the confidence and respect of the assured. In the long run such a loss may be greater by reason of the fact that the product and machinery have deteriorated because they were not promptly and carefully handled. Often it would have been much better if the assured and the adjuster immediately cooperated for the best interests of both the assured and insurer. The problem is one which the experienced adjuster can best handle based on his knowledge of similar losses, on his knowledge of human nature, and on the reaction of his assured upon the initial inspection of the loss.

Hours could be spent discussing the problems incident to the determination of value from books of account. In the handling of all fraudulent claims this part of the investigation is most important, for in the very fradulent claim it usually happens that the property is totally destroyed and the only way of arriving at the value is by means of the accounting records. In approaching the problem from this angle we sometimes find situations which are very amusing in spite of their pathetic aspect—property carried as an asset which is absolutely of no monetary, in fact, not even sentimental value—inventories over-priced.

Particularly a case is recalled of a company which made metal beds, composed of a head, a foot, and two side rails. Their inventory consisted largely of unassembled parts. Adjusters found upon examination of the records that these parts were valued at prices in some instances so high that when they compiled the cost of a finished bed, packed and ready for shipment, the total came to a figure almost double the assured's selling price of the completed merchandise.

Talk about a man fooling nobody but himself when he cheats at his golf score! In the adjust-

ment of losses we find a great many people going out of their way, and to considerable trouble, to fool themselves by their method of accounting.

THE old adage to the effect that figures will not lie, but that a liar can figure, certainly presents itself a good many times in the adjustment of fire losses from books of account. Some time ago a loss was adjusted with an assured who had what he termed a perfect set of records. He said they were in perfect balance and that, therefore, he was sure they were correct. Upon investigation we found that inventories had been inflated. Other merchandise which should have been charged off many years ago as of no value, was still set up as an asset. As a result, profits shown to have been earned had never been earned except on paper. Not only had the business made no money; it had lost money. And when we were through with our investigation and audit and presented to the assured the facts as we had found them, he said, "Well, this is certainly a fine situation. Before I met you I was a rich man, I had a good business—now look at it."

One of the most costly factors in connection with the adjustment of losses is, to my mind, the handling of the so-called "nuisance" loss. By that I mean a loss small and insignificant which, nevertheless, sometimes causes a great deal of difficulty, and certainly involves considerable expense in its adjustment. The assured reports this small loss, the adjuster visits the scene and attempts to make an adjustment. The assured doesn't know how much his loss is; doesn't know how much to claim, and is told to find out. From then on he loses interest, and often it is necessary for the adjuster to get in touch with him several times before the matter can definitely be disposed of. If the loss is of any consequence, and in any way affects the assured's business, he will give it preferred attention. Trivial matters he is prone to put off from day to day, and therefore very often the adjustment of a small loss requires more time and effort than matters of considerable importance.

Take a small loss to a building, for example. Some of the policies are in the name of the first mortgagee, some of them are in the name of the second mortgagee some of them the assured has in his safety vault, and the amount involved is too small to pay for the time to make a special trip to the bank to procure the policies. The same applies to the mortgagees, and when the adjuster finally disposes of the matter the time he has spent in the adjustment, and in the preparation of the proofs, could very easily be more than the amount of the loss itself. The company officials call the adjuster and want to know why the loss is not disposed of. They are desirous of getting the claim off their books, especially just before the end of the year. The adjuster gets after the assured, and often the most aggravating part of our business is disposing of these so-called trivial, nuisance losses. While each one is small, when we take into consideration the number of them, they must in the aggregate be a considerable portion of the total losses incurred.

Photo by P. & A.

One of the Adjuster's Hardest Tasks Is To Determine Damage From Book Accounts When Fire Has Licked Up Every Other Shred of Evidence

THERE is another subject on which I wish to touch very briefly—use and occupancy insurance, or, as some of our assured say, "disuse and non-occupancy." There are almost as many different interpretations of the various U & O contracts as there are people who attempt them. I have my particular viewpoint and I am sure it is right. Perhaps each of you has a different viewpoint, and no doubt each of you is just as certain of the correctness of that viewpoint. That, is the chief problem in connection with the adjustment of U & O losses.

The adjuster of automobile losses has problems, many of them not unlike the problems of the adjuster of fire losses. For example, there is the same problem with respect to over-insurance of an automobile as there is with respect to over-insurance of the other fixed values heretobefore discussed. Again, in the event of a partial loss

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Why We Still Keep Christmas

THE Christmas story never grows old. Each year it has a bigger audience. There is not a land on the face of the earth where it will not be told to some group of eagerly listening people; of little children, and of men and women whose hearts, burdened with the cares of living, will be gladdened and comforted by its good news.

It is a remarkable thing that in spite of the passing of many a tradition and many a legend the human heart still clings to the story of Bethlehem. It will not surrender it. Instead of dying it takes on new vitality. Long ago it came out of the East and spreading into western and northern Europe took over and made its own the pagan festivals by which the turning of the sun had been celebrated at the season of the longest night. It conquered and assimilated the Saturnalia of Rome, cleansing it of its worst elements and giving it a new and holy significance. It captured the gift-tree tradition of Teutonic and Scandinavian peoples, freeing it from the mythology of the strange gods of sky and mountain and forest to rededicate it to the feast of the manger.

THE scientific spirit of our age may question the tale of the guiding star, and may regard with scepticism the report of angelic choristers singing about "Goodwill to men;" but the Christmas spirit takes all that science has contributed and converts it to use in the wider observance of the event which is the theme of its story.

The wires of telegraph and telephone will carry its greetings; radio will broadcast the narrative as Matthew and Luke wrote it. Every method of transportation—by sky and land and sea—will bear homeward hearts which at this season are stirred by loving memories under the Christmas spell.

On millions of little trees the glowing spark of electricity—the light of our era of science—will shine to make joyous the world of childhood, and about these ever-green reminders of the Great Gift will be assembled the newest and the choicest products of human genius and craftsmanship.

Even more significant, perhaps, is the fact that in these latter years there has been a general revival of the old-time custom of singing the carols of Christmas. Where once a few would go from door to door to hymn the ballads which told of Mary and her child, of Wise Men and of shepherds, now whole communities gathered in the open square will lift their voices in gladsome unison.

A YEAR ago we chanced to be in a big mercantile establishment near the eve of Christmas. Business had taken us there; but suddenly as we were talking with the manager there was a movement in the outer office. Employes rose from their tasks and gathered at one end of the great room; others came pouring in from adjacent offices and places of work.

"Pardon me," said the man of business, "but this is the hour set for the singing of our Christmas songs. I must join in with the rest; will you come with me?"

For twenty minutes the building rang with voices raised in harmonious rendering of the old carols. That custom is increasing. Many follow it. Many more will follow it as the years go by. It seems that as the world grows older, and the pace grows faster, and life becomes more complex for all of us, we feel the greater need of what Christmas means.

Why do we still keep Christmas?

Is it not because the world still needs above all else that for which Christmas stands—the light of a guiding star, the peace and goodwill which the angels promised?

And the consciousness of its need increases.

Never have thoughtful hearts felt more than they do today the need of guidance. This world of ours has become a bewildering maze of paths which turn and cross, which wind and lose themselves. "Where is the way out?" we ask. "What is the goal, and which the road that leads to it?" There is a baffling, a perplexing clamor of cries. Bewilderment overwhelms us. Men's hearts are calling for light, and when Christmas comes we think again of the star. Perhaps if we could regain the faith of the wise men, the humility of the shepherds, the childheartedness of those who knelt at the manger, the star might shine again for us.

INDEED, never have thoughtful hearts felt more the need of peace and goodwill. The two cannot be separated. The one depends upon the other. Goodwill must be awakened in men's souls, must be maintained, must be given the means through which it can express itself if there is to be peace—peace in the home, peace in industry, peace in the state, peace between nations.

And peace there must be, or we cannot travel much farther the road of progress which the race has followed. Unless there is assurance of peace, there is no assurance that the great achievements of our civilization, with their marvellous promise of even greater things, will survive. Every gain that we have made may be lost in some titanic conflict. We may have to take the gifts which we lay at the foot of the Christmas tree and place them on the altar of Mars.

The world clings to the Christmas story because it holds the only hope for humanity which has endured through the years. If we lose that we have lost everything. Life is without significance. The future is dark with foreboding.

SO IT is that as the miracle of birth is constantly repeated, and the race perpetuated; as each new babe is loved and nurtured, we recall the Christmas nativity and our hope is renewed. Perhaps the gen-

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Life-Lights Against a Business Background

Main Street and Christmas

By S. J. DUNCAN-CLARK

I WAS sitting in a restaurant reading a book while the waitress was assembling a modest luncheon to place before me. I had no companion at my table, but at one adjoining me sat two youths. They were typical of the wise-cracking element of youth which is so much in evidence today. I learned that as fragments of their conversation reached me, diverting attention from my volume. Listening in on other folks' talk is not a habit of mine, but to avoid hearing much of what these boys said would have required putting cotton in my ears. Like their kind they talked rather loudly, and laughed without restraint.

"Now that Thanksgivin' is over what you goin' to do about Christmas? Goin' home?" asked one. There was the suggestion of a jeer in the last two words.

"I guess so," answered the other youth, whose face seemed to me to have more in it, a likable hint that was lacking in the expression of his friend. "I guess I gotto. Dad wrote me last week sayin' he'd send me money to come home. We're havin' a sort of family reunion in the old town, and there's goin' to be big doin's on Main street."

"None of that Main street stuff for mine," declared the smart youth opposite him. "Me for the big city and the bright lights. When I quit the hick town where I was born, I quit it for good. I'm goin' to make some dates for Christmas week that will keep things hot for this boy, and I'd let you in on them if you'd stick with me. Why not write the old man and tell him you're too busy to get away?"

"I'd like to, Bill. P'raps I may. I guess you and me could have a swell time, all right. There are a few dates I'd like to make myself. There's a nifty little Jane up in our office. She's been warmin' up to me a lot lately. I'd sure like to try a little holiday, doin' something and goin' somewheres with her. I guess you're right about Main street, and the old home town is hick, I'll tell the world. Why they hardly know they're livin' back there. If a girl used a lipstick they'd want to send her to the reform school, and if she smoked a cigarette they'd do it.

"I can just picture what the big doin's will be—community Christmas tree, carol singin', pious talk by the preacher, and then sittin' around watchin' the merry old yule log burnin' while Pa and Ma tells about all the Christmasses they ever spent. Here we could take in a show or two and go to Dreamland Casino for a dance, and—"

"And do a cabaret with somethin' on the side in a bottle," finished the other boy, with a wink that was meant to be devilish, and a glance at me to see if I was impressed.

"Think it over, kid. We'll have the time of our young lives if you turn your Pa down. Tell him all about the Christmas rush, working over time and all that. We'll be doin' it all right, only not the way he thinks." He jumped up suddenly from his chair, leaving his pie uneaten. "There goes a Jane I want to date. See you later," he said, as he made a hasty dive for the cashier and then the door.

HIS companion slowly sipped a cup of coffee. I could see he was turninig over in his mind the alluring possibilities of a gay Christmas in the city. I had finished my lunch, and as I struggled into my overcoat I moved nearer to his table. He looked up and caught my eye. I smiled. He smiled back, and I felt sure then he was not as far from Main street as his smart-aleck talk suggested. I felt so sure that I presumed upon the smile.

"I didn't mean to listen, but I couldn't very well avoid hearing what you and you're friend were saying just now," I remarked. He grinned a little sheepishly.

"I guess we did chatter rather loudly," he said.

"Well, I just wanted to remind you that most of the fine things the world enjoys came from so-called hick towns. We owe Main street a lot more than some of us city folk are accustomed to lay to its credit. If it hadn't been for the men who got their start on Main street, or somewhere less important in the eyes of thoughtless people, we would not be very far along the road of progress. And the men who have done really worth while things in the world as a result of a Main street start have never been little enough to sneer at the small town. Think of Lincoln, and John Deere and the Wright brothers, and Mark Twain, and Henry Ford and—and—and Lindbergh," I said for a clincher.

"The big city is a big city because the country and the small towns made it; and if they didn't feed it with new blood and rural-bred brain and character it would die of dry rot, or run itself to death trying to be up-to-date and smarter than anybody else. Believe me, son, it is the fellows who haven't forgotten what they learned in the small town home and the small town church who are the leaders in the big city today, and they are grateful."

"I guess you're right, mister," the boy said. "Matter-of-fact I'm kind of homesick for hicktown, but I didn't want Jim to know. I'm goin' to write dad tonight that I'll be along for Christmas. Those dates can wait—I ain't made any yet anyhow."

"And you might remember when you're packing your suit case," I said, just as an extra word which might possibly push his mind a little farther along the new and safer line it had taken, "You might remember that this whole Christmas celebration started in a small town called Bethlehem. There wouldn't be any Christmas for the big city or anywhere else if it hadn't been for something which happened in a stable of that hick town near which the shepherds watched their sheep."

He smiled again, and I knew I had struck a trail that reached memories he still cherished in spite of all the big city had done to dim them.

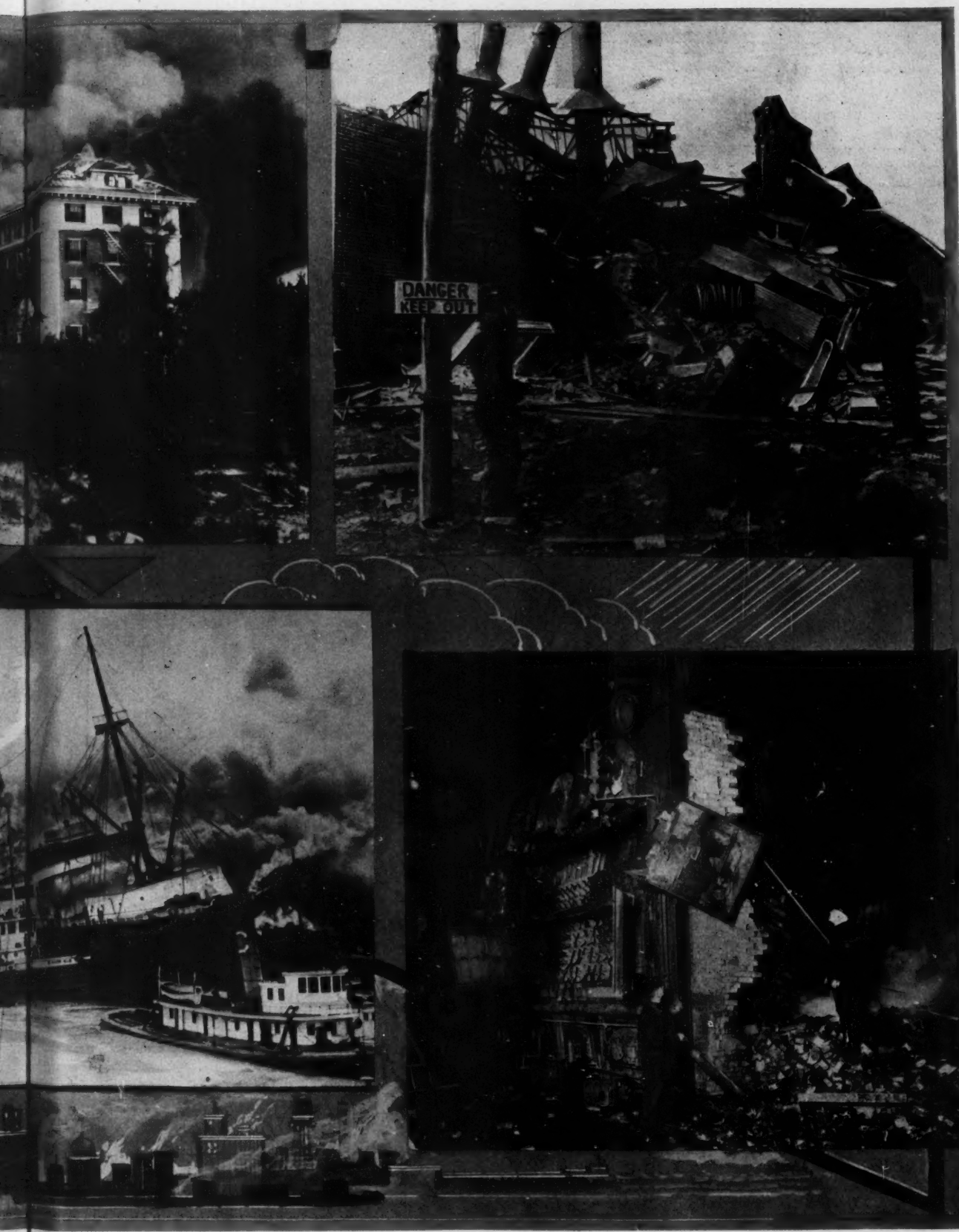
When An Auto Argued *With a Dangerous Spot in the Road (Left at Top) the Force of Gravity Won and the Result Is Shown Here.*

Churches Are By No Means Immune From Fires *(Left at Bottom) as Witness This Spectacular Blaze Which Occurred in New York State.*

INSURANCE SOF

A Classic Picture of Raging Flames *(Top Center) Is This Famous Photograph of the Doom of the Breakers Hotel.*

Tug
Bott



...TENS DISASTER

Tugs Battling For the Life of a Steamer *(Center Bottom) Which Caught Fire and Endangered Many Sister Ships Nearby.*

Photos by Brown Brothers

In Spite of the Sign, Danger Did Not Keep Out *(Upper Right) and an Explosion Tossed Havoc Everywhere.*

Another Explosion Ripped Its Way *(Lower Right) Through the Buildings and Equipment of a Power Station.*

Adjusting

(Continued from Page 13)

to an automobile there is the problem as to who should repair the car. The assured is insistent that the car should be repaired at the service department of the maker. The successful adjuster of automobile losses must be well versed in all makes and models of cars. He must be familiar with the cost of parts and with the labor necessary to put the car back in the same condition it was in before the accident. He should be so familiar with the work at hand that he is able to discuss intelligently with the service department of any company the work necessary, and a fair cost for same. The mere obtaining of a competitive bid from some individual shop, not known to the assured, and attempting to use such bid in the adjustment of the loss is not fair to the assured and does not require the ability of a first class adjuster. Anyone can do this. It does not satisfy the assured, it leaves him justly discontented and is an injury to the business.

A problem which the adjuster is often confronted with is the case of a dishonest assured reporting a collision damage as a theft loss. The assured who carries no collision insurance, has an accident, abandons his car, removes himself to a remote part of the city and notifies the police department that his automobile has been stolen. It is recovered, he reports the theft to his insurance company and often is paid for a collision loss under a theft policy.

The adjuster cannot be too careful in investigating losses of this character. A great many companies object to the expense in connection with a careful investigation. It sometimes requires considerable time to ascertain all of the facts and to get an exact picture of what actually happened. In assuming an attitude of objection such as this, the company makes a mistake, for you may be sure that for every dishonest loss of this nature which is collected, there are many subsequent claims of like nature. For man is ever prone to brag and tell his fellowmen how smart he is.

LAW suits are a problem. The experienced adjuster avoids as many as he can, although often we are forced into suit. Witnesses who will testify on behalf of an insurance company are not so easy to find. They are even harder to keep after you have found them. When you take into consideration the fact that in most instances cases do not come to trial for anywhere from two to three years after the loss occurs, you can imagine what a difficult problem it is to keep in touch with the whereabouts of your witnesses for that length of time. In the meanwhile other people have had plenty of time and opportunity to work on them and it is sometimes surprising what a change can come over a man, what a loss of memory he can have during this particular period. Re-

cently I was interested in a loss where the assured had been indicted for arson. The first time the case was called to trial the court room was full of witnesses. Briefly, the case was continued twenty times and at each continuance there was a marked decrease in the number of witnesses present. The assured eventually was found guilty, and, a few weeks later was granted a new trial.

In conclusion, I wish to say that not the least of the fascination of the adjustment business is the uncovering of an occasional bit of unconscious humor that most men find only once in a lifetime. One of the choicest of these little jewels occurred last winter when a case was being tried in one of our local courts in Chicago. It involved loss by fire to a stock of merchandise on the south side. The companies had denied liability, setting up as a defense fraud.

Henry—I don't remember his last name—was one of the witnesses for the insurance company. He was very dark of complexion, he was scared and very uneasy. This was the first time Henry had in any way been mixed up with a court and he had an overwhelming respect for the law.

On direct examination, Henry testified to the effect that on the night of this particular fire, or rather about two o'clock in the morning, he was preparing to close the pool room in which he was a porter. This pool room was immediately adjacent to the establishment of the assured. Henry was standing behind the cigar counter in the front part of the building when suddenly he heard a resounding boom and immediately rushed into the street. It was very cold and the sidewalk was full of ice, and as Henry reached the street one of the proprietors of the store came awkwardly through a plate-glass window, together with a lot of fixtures, stock, glass and so forth. As Henry was running too fast to stop, he tripped over a man, fell, and in the mix-up recognized his next door neighbor, later identifying him.

The attorney for the plaintiff in cross-examining Henry said, "Henry, now tell me, how many minutes was it between the time you heard the boom and the time you fell over this man on the sidewalk?"

Henry's instant reply was, "Boss, there wain't no minutes."

"How many seconds was it, then, Henry between the time you heard the boom and the time you fell over this man on the sidewalk?"

"Boss, there wain't no minutes, there wain't no seconds. That was right then!"

It was very evident that Henry heard the boom and said, "Feet, do your work."

Judge—"I fine you $1.10 for beating your wife."

Prisoner—"I don't object to the dollar, but what's the ten cents for?"

Judge — "That's the federal tax on amusements."

"Betty is angry at me."

"How come?"

"I was two hours late last night and she had been ready for at least seven minutes."

Mrs. Nut (handing her husband a saucerful of white powder): "John, taste that and tell me what you think it is."

Mr. Nut: "It tastes like soda."

Mrs. Nut: "That's what I told Bridget. She declares it is rat poison. Taste it again to make sure."

Use and Abuse of Insurance

Discussion of Certain Common Practices Which in the Long Run Do No Good to Either Policy Holder or the Company

By DR. V. N. VALGREN
Washington, D. C.

BY THE application of insurance principles, according to the preable to the first English marine insurance statute, "An Acte Concerninge Matters Of Assurances Amongste Merchantes," which was passed in 1601, "it comethe to passe that—the losse lightethe rather easilie upon many than heavilie upon fewe." To bring about the situation thus set forth in the quaint Elizabethan English of more than three centuries ago, is still the purpose of all insurance. This purpose should not be overlooked either by those who design and administer forms of insurance, or by those who avail themselves of insurance protection. It is with the distribution of such loss burdens as would prove oppressive or disastrous when falling upon the unprotected individual that insurance is properly concerned.

To attempt to apply the principles of insurance also to trivial losses, which can be borne by those upon whom they fall without perceptible inconvenience or deprivation, results only in delusion. It becomes in fact an abuse rather than a use of insurance principles. Even if the distribution of loss burdens through insurance could be carried on without any element of expense, it would be meaningless to distribute trivial losses among the group of insured. But as everyone knows, this distribution does involve substantial expense. The assumption of numerous insignificant losses by insurance companies becomes, therefore, not only meaningless, but an expensive byplay which needlessly increases the cost of worth-while protection and detracts from the economic value as well as the dignity of insurance institutions.

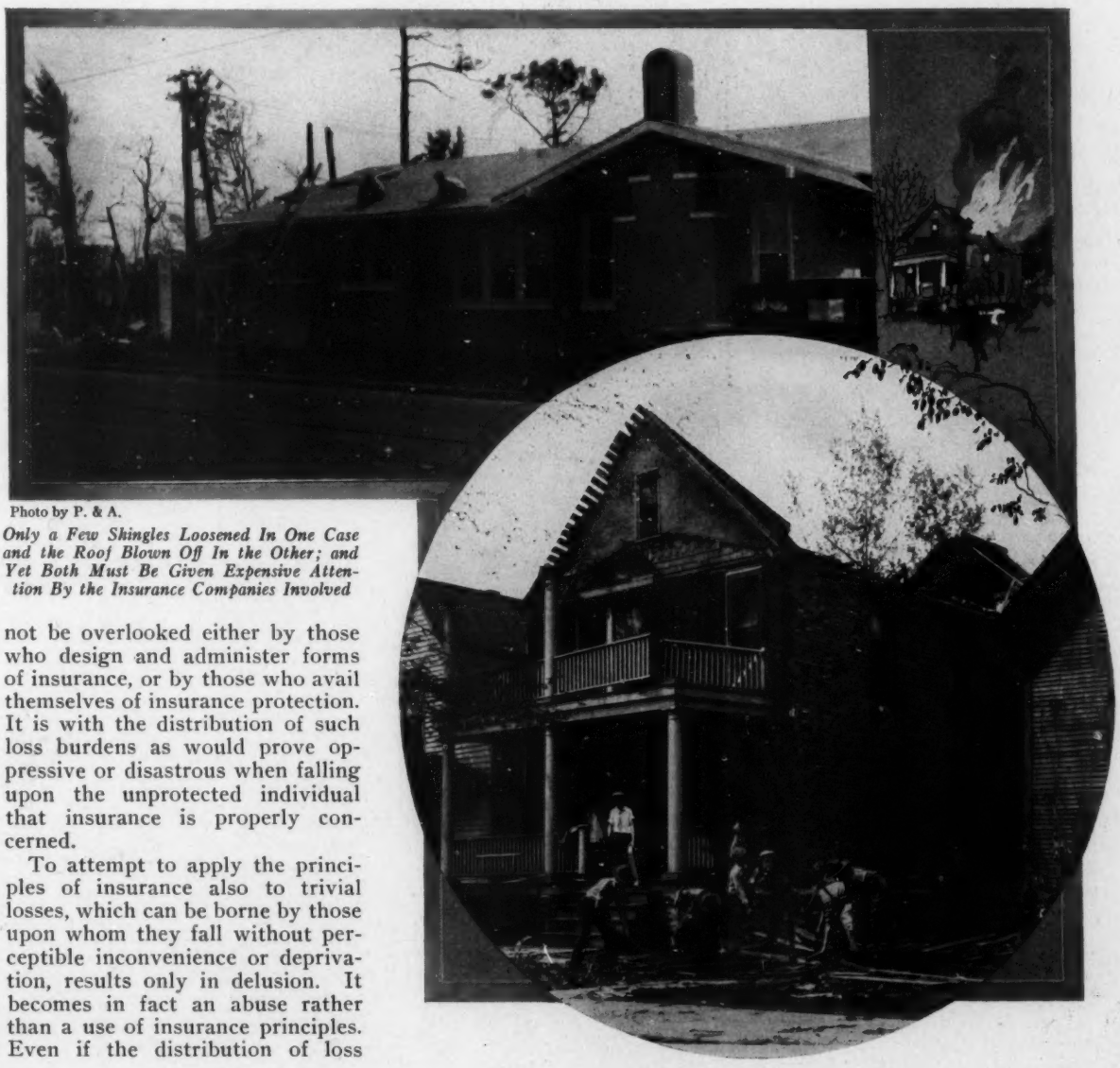


Photo by P. & A.

Only a Few Shingles Loosened In One Case and the Roof Blown Off In the Other; and Yet Both Must Be Given Expensive Attention By the Insurance Companies Involved

IT IS particularly in the field of windstorm insurance that the practice on the part of the companies of covering trivial losses, and the habit on the part of the insured of demanding pay for such losses, has become a vexing problem to those who have a broad and sincere interest in insurance and an appreciation of its proper function. Windstorm gives rise to far

more cases of minor damage or loss than does fire for example. This is particularly true in the case of farm risks because of the variety of light buildings and the assortment of equipment found on the farm. In fact as a cause of numerous trivial losses interspersed among the really serious ones, the only rival to windstorm among the more common hazards covered by insurance, is that of hail to farm crops. But in the case of hail insurance on crops it has become a wellnigh common practice to exempt the company from liability for any loss or damage which falls below five per cent. The standard hail contract goes even further than the application of a minimum loss clause in attempting to eliminate claims for very small cases of damage. It also provides for the assessment against the insured of the cost of investigating any claim for damage falling below the stipulated minimum. While this charge or penalty has rarely been invoked, it has no doubt had a salutary effect in discouraging claims for insignificant losses.

But we return to windstorm insurance where in the case of most companies no adequate safeguard against trifling claims has been applied. A few shingles may be blown off, or a piece of composition roofing may be torn away. An open barn door may be slammed by the wind and damaged, or it may be torn from its hinges. A hayrack may be turned over or tipped from a wagon, with only minor damage. The actual cost of repairs may be two or three dollars; perhaps a single dollar or even a fraction of a dollar.

A report of loss is forwarded to the insurance company. Correspondence follows. A formal adjustment may or may not be dispensed with but in any case a proof of loss is usually required to be made out and sent to the company together with a bill for the repairs. The proof and the bill are examined in the insurance office. If these are found satisfactory a loss voucher or a check is made out and mailed to the insured, or perhaps sent to the agent for delivery to the insured. The voucher or check is taken to the bank and cashed, after which it goes back to the insurance office to be filed, or in the case of the voucher, to be paid by a check. In the meantime the loss has been made a part of the records of the company.

EVEN when the procedure is wisely or unwisely made somewhat simpler than that above outlined, the application of insurance principles to minor repair items is too much like using a five-ton truck to deliver a spool of thread. The indemnity to the insured may have been hardly sufficient to pay him for his extra trouble in getting his small repair bill cared for. In such a case not only the expense incurred by the insurance company, but also the small indemnity itself has been completely thrown away. The insured as a group are in any event the ultimate losers from a needless and wasteful distribution

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of repair items that would form no perceptible burden if left with those upon whom they happen to fall. The increase in insurance cost is promptly passed on to the policy holders by the mutual companies, and somewhat less promptly, perhaps, but nevertheless surely by the joint stock companies.

Furthermore, this added and economically unjustifiable cost is distributed and assessed against all the insured. Those who from a sense of self-respect and public spirit refuse to take advantage of their contracts to report and press negligible claims, bear their proportionate part of the added cost, as well as those who do take advantage of their policies and thus impose the needless burden on the group. In other words, the more broad-minded and unselfish are punished equally with the more narrow-minded and selfish for the waste directly occasioned by the latter.

Strangely enough this abuse or misuse of insurance principles with its waste of insurance money, proceeds in many cases with the approval, if not with the encouragement of the insurance company. This statement may perhaps be challenged on the ground that insurance companies naturally strive to hold losses and expense in check. It is a fact nevertheless that many insurance companies look upon the liberal payment of trifling losses as strategic advertising, or as a shrewd way of purchasing the good-will of short-sighted policy holders. The honest and clear-thinking among the policy holders on the other hand will very properly resent this practice with its needless loading of the cost of true insurance protection. Like this latter class among the insured the more clear-sighted and conscientious among insurance officials and agents also regret and resent the waste incident to the settlement of trifling claims, even though their own company may be involved in the practice.

A NUMBER of the mutual windstorm insurance companies have quite successfully safeguarded themselves and their membership against this waste, by the use of a minimum loss clause in their policies. The most common minimum used is $5. This means, of course, that the company is not liable under its policy for any loss unless it equals or exceeds the stipulated minimum. A few mutual windstorm companies have such a clause exempting them from any loss amounting to less than $10. The majority of the windstorm mutuals, however, like the joint stock companies, have no such minimum.

Some of these mutuals that have hitherto assumed liability for all losses regardless of amount, are at present seriously concerned about some method that will avoid the waste and annoyance involved in trifling losses. Representatives of joint stock companies, and particularly those that have had experience with farm risks, have also expressed themselves in favor of action with this aim in view. One of the chief obstacles to such a move is the fear of competition from companies that may continue to pay for small repair bills. Even if this obstacle could be removed by general agreement among the

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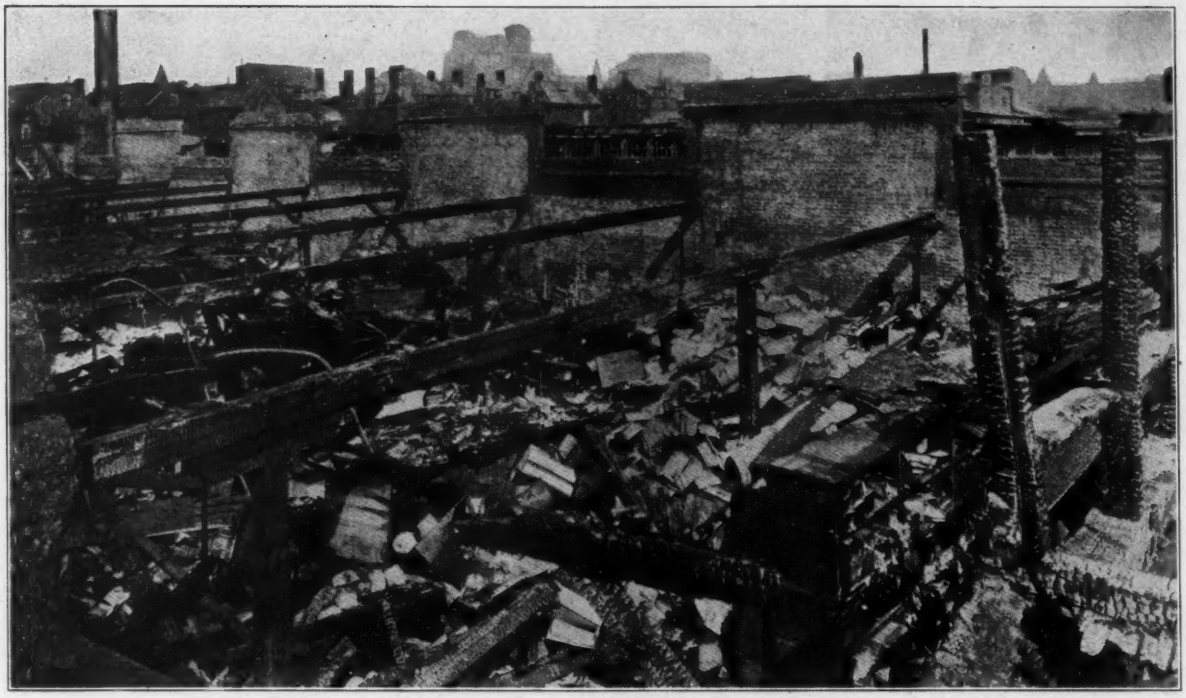

More than Three Hundred Sprinklers Idle

Shut-off sprinkler protection allowed fire to destroy the second story of Building A in foreground. The brick wall kept fire out of Building B beyond, but the flames driven by a forty-mile gale swept over the parapets and arounud the wing walls at monitors, igniting the smooth-surfaced roofing and the exposed woodwork beyond

Lessons From Odd Disasters

Results of Failing to Provide Fire Protection During Repairs to a Building and What Happened to a Water Tank Faultily Constructed

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Factory Mutual Record
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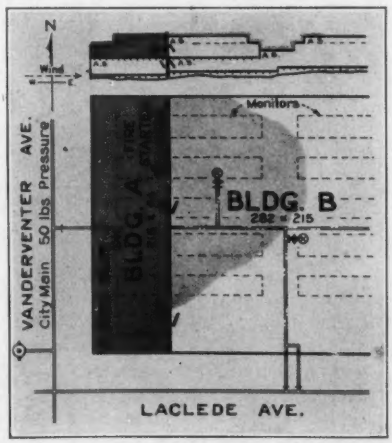
VANDEVENTER AVENUE runs north and south for four miles through St. Louis. It is an important thoroughfare and portions of it are to be widened.

For the proposed widening, the city had condemned and paid for a twenty-foot section of Building A of the George D. Barnard Stationery Company.

The contract had been let for razing this section and for erecting a new wall. At 8:50 o'clock Monday morning, March 26, workmen closed the sprinkler-control valve preparatory to changing the piping. The valve was located on the riser in the first story. Shutting it deprived the entire building of sprinkler protection. There was no outside control valve.

The plant management did not notify the Factory Mutual Companies in advance. They would have advised that the work be arranged so that water could be kept on the sprinklers in the sections where the piping was not to be removed, that extra chemical extinguishers be provided, that a watchman remain on duty, and that special precautions be taken to prevent fire.



Dark Shading Shows the Extent of the Fire Which Gutted the Second Story of Building A and Destroyed the Roof. Light Shading Shows Extent of the Fire on Roof of Building B

The men started to take down some of the piping. Meanwhile, the building owners had moved most of the storage of bank and office stationery and supplies from the condemned west section and piled it against the east wall, which was a brick fire wall cutting off the adjoining Building B. The chemical extinguishers in the building were removed to the engine room, where they should have remained.

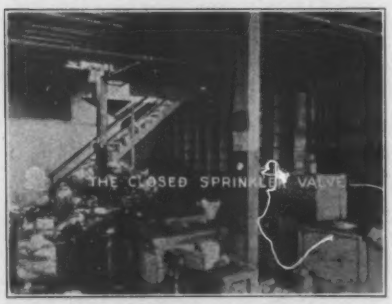
AT 12:45 P. M., four hours after the sprinkler valve had been closed, the plant engineer heard a "howl" in a generator in the engine room in building B. He at once sent his assistant to find the trouble. A few minutes later the assistant came running back, shouting that the second story of Building A was on fire.

The engineer, remembering that the sprinklers were shut off and the extinguishers removed, sensed the danger, and promptly rang in an alarm at a box in Building B. At the same time, one of the

sprinkler workmen, who had also seen the fire, ran out of the building and rang an alarm from a box on the street. He then rushed back into the first story of Building A and tried to open the sprinkler valve, but already smoke was pouring down the open stairway and the heat had become so intense that he was able to open the valve only a few turns before he was driven out. Even if the valve had been opened wide, it is probable that the sprinklers would have been only partly effective, as several pipe lines were disconnected and the other lines still in place would have lacked adequate water due to wastage from the open ends. Plugs were on hand for restoring partial sprinkler protection at night but had not been put in place for the short interruption of work during the noon hour.

When the first firemen arrived, the fire had gained such headway in the joisted construction that they immediately sounded a general alarm, calling out eighteen pieces of apparatus. About ten lines of hose were laid at various points around the plant.

Meanwhile, with the sprinklers out of commission, the fire spread along the joisted ceiling and up into the monitors, soon breaking out the glass, so that flames appeared above the roof, ignited the exterior woodwork, and then spread over the smooth-surfaced felt and asphalt roof covering.



When the Smoke Had Cleared

After giving the alarm, the sprinkler workman ran into this room, groped his way to the closed valve, but could open it only a few turns before he was driven out by smoke and heat coming down the open stairway beyond

THE monitors of Building B were extensions of those on Building A and the fire wall extended up through them. The wall was parapeted two and one-half feet above the roof and extended nearly two feet beyond the sides of the monitors, but some of the outer edges of the overhanging wood cornices were flush with the vertical edge of the wall and some extended out beyond it.

A forty-mile gale carried the flames directly toward Building B. Driven by such a heavy wind, the fire leaped the parapets and set fire to the smooth-surfaced roofing. At the sides of the monitors, the flames swirled around the edges of the wall, ignited first the cornices, then the wooden window frames and the roofing, and soon swept down the length of the monitors. Windows broke and the fire started to eat its way into the interior, but the automatic sprinklers opened and prevented the fire from entering. Hose lines on the roof and other streams used from the top of a commandeered street car checked the flames after they had spread to a second set of monitors about halfway down Building B.

Meanwhile the fire raged in the second story of Building A. Smoke and heat prevented firemen entering, and their hose streams could not reach the seat of the fire. The spaces between joists are largely inaccessible to hose streams and favor rapid burning. The fire finally ate through the roof and completely destroyed a large section of it. Not until three o'clock was the fire under control, and several streams were kept playing into Building A for an hour and a half longer.

The fire wall had two openings with tin-clad fire doors on each side. One set of doors operated automatically and the other was closed by hand before the heat operated the fusible links. The fire walls and doors kept the fire from spreading into the interior of Building B.

IN THE second story of Building A, the storage of printed legal forms, letter heads, ballot forms, and ballot boxes was nearly a complete loss. In the first story, the stock was badly wet down. In Building B, some stock and machinery were wet down. Skids under paper storage prevented greater damage. Men started work at once to remove damaged stock, to oil machinery, and to make temporary repairs to the monitors, so that Building B was again in full operation on Wednesday afternoon, two days after the fire. A preliminary estimate of the loss is between $100,000 and $150,000.

All direct evidence as to the cause of the fire was destroyed. Electricians had been making changes in the wiring, which was the open type. The engineer's assistant further states that he found the fire burning near a point where several cartridge fuses were mounted on open porcelain bases fastened to the wall. These facts point to a probable electrical cause, perhaps a short circuit igniting insulation or blowing a defective fuse which might have set fire to loose combustible material nearby. Careless smoking by workmen is a further possible cause.

Looking Along the Fire Wall

Note the overhanging cornice extending out beyond the wall at right, one of the points where the fire jumped to the roof of Building B

LESSONS

During reconstruction work of this kind, as much of the sprinkler equipment as possible should be kept in service. In this case, the system was so arranged that the portion to be torn down could have been quickly disconnected, the remainder plugged, and water again turned on, without shutting off the entire system but for a relatively short time. The sprinklers over the point where fire broke out would then have been in service and undoubtedly would have checked the fire at its start.

The Insurance Company will give helpful advice and should be notified in advance of shutting off protection. Insurance is written on the understanding that certain standards will be maintained, and any increase in hazard or reduction in protection requires that notification be given.

Extra watchman service and additional fire extinguishers should be provided, possible fire causes eliminated, and unnecessary accumulation of combustible material

Where the Fire Swept Across the Roof

This is the roof of Building B, looking toward Building A. The undamaged monitor in left foreground shows typical smooth-surface roof covering on top and end. The next monitors show damage to this covering

prevented, whenever sprinkler protection must be shut off. The hazard of disturbed electrical equipment should be guarded against and smoking strictly forbidden.

Independent outside sprinkler-control valves readily accessible at all times is a further need shown by this fire. Inside control valves may be inaccessible, due to smoke and heat, and should be replaced by outside valves or relocated outside the area they control.

Substantial fire walls with openings protected by standard fire doors are effective barriers against the spread of fire. Fire walls with wooden construction on each side should extend out far enough at sides so that fire will not spread around them.

Smooth-surfaced asphalt roof coverings spread fire driven by the wind. Such roofs should be surfaced with gravel or slag.

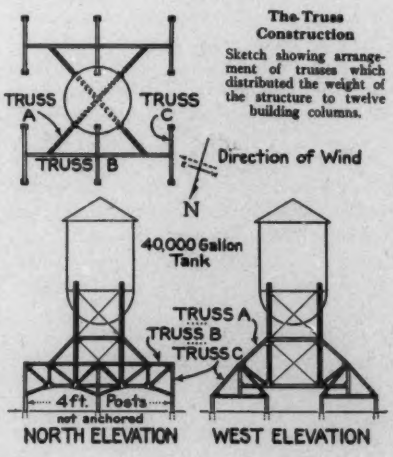
The value of skids under stock susceptible to water damage is again demonstrated.

Danger From Wind Pressure on Feeder Tanks

IN New York City during the early hours of January 25, a strong wind reached gale velocity. It continued unabated from the west throughout the morning and at noon attained velocities of over seventy miles per hour, as reported by the Weather Bureau.

Between twelve and one, most of the employees in the Varick Realty Company's building at the corner of Washington and Hubert Streets were out for lunch. At twelve-thirty, the few who remained in the eleventh or top story heard the concrete roof start to give way and had just time to run away from the center of the room. As they did so, the large 40,000-gallon sprinkler tank and its supporting structure of steelwork crashed through, opening a hole sixty feet long and forty feet wide. It broke through the concrete of the eleventh floor, then the tenth, and came to rest in the ninth after partly breaking through that floor also. One man was carried down by the debris and partly buried. He was later extricated by firemen and was able to walk downstairs to an ambulance. Others suffered only minor injuries. Fortunately no one was killed. Loss of life would have been heavy if the collapse had occurred either before or after the lunch hour.

The building was largely occupied for printing and binding. The released water did serious damage to partly bound books on the top and eighth floors, and slight or moderate damage in other floors. Water accumulated in the basement and did serious damage there.



The Truss Construction

Sketch showing arrangement of trusses which distributed the weight of the structure to twelve building columns.

FOUR pressure tanks also feeding the sprinklers were located in a roof housing and contained 20,000 gallons of water. They were out of reach of the falling gravity tank and were uninjured, but the piping was broken so that the water was discharged and added to that from the wrecked gravity tank.

The Factory Mutuals insured only the stock of books belonging to the McGraw-Hill Book Company on the premises of the Butler-Ward Company, bookbinders, in the top story. The loss to this stock was over $13,000, and the total loss is estimated to be between $200,000 and $250,000.

TANK CONSTRUCTION

The tank was of steel with a hemispherical bottom, supported twenty feet above the roof on a complicated structure of steel trusses. The structure and full tank together weighed 360,000 pounds and the load was distributed to twelve of the cast-iron building columns, which were adequate.

The tank and supporting structure were erected in 1913. They had received excellent care, were well painted, and showed no signs of corrosion.

The accompanying cut shows the unusual design of the structure. Detailed drawings were not available for examination after the acci-

(Continued on Page 30)

Abuse of Insurance

(Continued from Page 20)

companies, there is by no means a unanimity of opinion that a minimum loss clause is the proper solution. In fact a few of the mutuals that formerly had such a clause in their contracts dropped it, not so much for competitive reasons, but rather because according to their experience it involves a tendency toward another evil.

A less scrupulous insured who finds the minimum loss clause in his contract is undoubtedly tempted to pad his claim and his bill for repairs whenever a formal adjustment is dispensed with, so as to bring the bill up to or slightly above the minimum amount for which the company assumes liability. Even an adjuster sent out to adjust a claim which in fact calls for three or four dollars of actual repairs or replacement, is often considerably tempted to allow five dollars when that happens to be the minimum loss assumed by the company. The really honest and efficient adjuster can of course be relied upon to refrain from serious elasticity of judgment and of conscience even in these circumstances, but the temptation is undoubtedly there. In any case it does not seem quite equitable that a man with a loss of $4.50 for example should receive nothing, while another insured, with a loss of $5 or perhaps of $5.50 should receive full payment for his loss.

A FEW of the windstorm insurance mutuals have given quite serious consideration to the adoption of a loss deductible clause rather than a minimum loss clause, but so far as known no company has as yet applied such a clause to a windstorm contract. There appears no good reason, however, why this should not be done. Suppose that a loss deductible clause substantially in the following form were adopted:

"It is understood and agreed that the Company shall not be liable for any loss or property hereby insured unless the net loss shall exceed $10.00, and then only for such excess not exceeding in any event the amount of insurance hereunder."

This would mean, of course, that the insured would agree and be required to bear any loss not exceeding ten dollars and also the first ten dollars of any loss which did exceed this amount. If the insured and the adjuster, under this provision, should raise a nine dollar loss to eleven dollars, for example, the former would collect not the eleven dollars, as would have been the case under a minimum loss clause of corresponding amount, but only the excess over ten dollars, or one dollar. This eliminates the special temptation, as found in the minimum loss clause, to pad a minor loss in order to bring it to or above the minimum. It also removes the minor but nevertheless obvious discrimination, under the minimum loss clause, as between the man who has an actual loss slightly below the limit and his neighbor who may have a loss that equals or somewhat exceeds the limit. There is nothing new about a minimum loss provision of this kind. It is regularly used in collision insurance on automobiles and also in certain other forms of coverage.

In lieu of the ten dollar deductible above suggested, a five dollar limit to the part to be borne by the insured may, of course, be substituted. It seems, however, to be the feeling of some of those who now have a five dollar minimum loss clause that this limit is too low. It has been pointed out for instance that a ten dollar repair item is of less significance today than was a five dollar repair bill a score or more years ago when the minimum loss clause was first incorporated in windstorm policies.

A ten or five dollar loss deductible clause will not entirely eliminate the settlement of losses for small amounts, but it will greatly reduce the number of cases in which this becomes necessary. Among some of the larger mutual windstorm insurance companies that now have no minimum loss provision, as high as 40 or 45 percent of the number of losses have been for amounts of less than five dollars. One smaller company reports 67 percent of its losses in 1927 as falling below five dollars. In gross amount, as distinguished from number, the losses in the size group just mentioned rarely exceed 10 percent of the total losses. More generally they fall below 5 per cent.

While no comprehensive statistics are at hand, it is perhaps safe to say that a provision for a five dollar deductible would reduce the number of windstorm claims, on farm property at any rate, by an average of about 33 percent for companies now without any minimum. A ten dollar deductible provision would under similar circumstances reduce the number of claims to one-half or less. The insurance waste involved in the settlement of claims for very minor repairs would thus be quite effectively eliminated, even though the payment of a certain number of minor indemnities covering small amounts above the deductible would occur. Much of what has been said about a loss deductible clause as against a minimum loss clause for windstorm insurance will apply also to hail insurance.

In conclusion it may be emphasized that it is to a waste brought about by an abuse or at any rate a misuse of insurance principles, and which inevitably increases the cost of worth-while insurance protection, that objection is here made. While as in the case of all losses the insurance companies from the funds in their custody advance the money to pay these trifling claims for minor repair items and the disproportionate expenses involved, the "Incidence" as students of taxation would say, falls upon the insured. It is not contended that the added and needless burden resulting from the wasteful practice here considered is enormously large, but it appears to be growing. Like the barnacle on the ocean liner, it should be removed in the interest of economy and efficiency. If any one has a better plan for correcting this evil, those interested in sound and economical insurance will be glad to learn of it. If no better plan is available why not try the loss deductible plan?

Doctor (examining unconscious engineer): "Did that automobile hit his engine?"

Fireman: "No, the driver slowed up to let the train go by and the engineer fainted."—Woman's World.

"The doctor will see you inside," said the nurse to the patient as she helped him on to the operating table.

Wife, reading: "It says here they have found a long-legged sheep in the Himalaya mountains that can run 40 miles an hour."

Her Hubby: "Well, it would take a lamb like that to follow Mary now-adays."

"I never like to eat."

"Why's that?"

"It spoils my appetite."

Photo by P. & A.
Many a Farmer Has Worked Hard Harvesting a Crop in the Fields Only to Find that His Profits Have Gone Up in Smoke

Mysterious Farm Fires

Some Observations on Spontaneous Ignition of Hay Together With Digest of Studies Made Concerning Storage of Similar Products

By DAVID J. PRICE

Engineer in Charge of Chemical Engineering Division Bureau of Chemistry and Soils, United States Department of Agriculture.

From an Address Delivered at Annual Convention of the National Association of Mutual Insurance Companies, Milwaukee, Wisconsin, October 2, 1928.

THAT such a large number of fires of agricultural products ascribed to "spontaneous combustion" is ample justification for a discussion of the subject. Any one interested in the determination of the cause of fires, particularly on farms and in rural communities, and in devising ways for their prevention, is impressed with the importance of this problem. Using a more common term, "self ignition," may make clearer just what is embraced in the term "spontaneous combustion."

It is not the purpose to enter into a technical discussion of this subject by dealing with any of the chemical or bacteriological phases. It probably will be of more practical value to confine this presentation to outlining the problem in such a manner as to show its importance and the attention that is now being given to its solution.

Work of the United States Department of Agriculture

THE Chemical Engineering Division of the Bureau of Chemistry and Soils of the United States Department of Agriculture is making a special study of farm fires with a view to the development of control and prevention measures. In this work the Department is cooperating with practically all national organizations interested in farm fire prevention. The Department has leadership in the work of the Farm Fire Protection Committee of the National Fire Protection Association, on which committee the National Association of Mutual Insurance Companies is represented. The committee after a careful survey, is of the opinion that the annual loss from fires on farms and in rural communities is approximately $150,000,000, and that about 3,500 lives are lost every year from farm fires. These losses are so great that any national effort to reduce them would be amply justified.

The annual farm fire losses can be attributed to many causes. Spontaneous or self-ignition of hay and other agricultural products is now regarded as one of the principal causes. It has been conservatively estimated that a loss of $30,000,000 a year can be charged to this cause. It may be of interest, therefore, to refer to some of the attention that is being given to this much misunderstood occurrence.

Barn Fires in Vermont Flooded Areas

UNUSUAL conditions in the Northern Vermont flooded areas, where the water reached the hay mows of hundreds of barns, offered exceptional opportunities for studies relating to the spontaneous or self-heating of agricultural products*. Observations were made by Department of Agriculture investigators in many barns in the Winooski, Lamoille, and Mississquci River Valleys. Excessive heating set in almost immediately after the flood waters receded, in many cases endangering the houses and other farm buildings. The observations on spontaneous heating in Vermont barns can be summarized as follows:

1. The hay was covered with water ranging from one-half foot to 17 feet.

2. In every pile of wet hay observed some "heating" had taken place, many to the point of being considered dangerous.

3. Heat was generated in the bottom layers of the piles, and escaping up through the hay led to the production of drafts of hot gases or "flues" that rose to the surface.

4. The large quantity of moisture carried with the hot gases from the lower layers was condensed on the upper, cooler hay, or in the air above. Many hay piles had been soaked throughout by the falling condensed moisture.

5. In removing the hot hay from the barns, one farmer observed charred materials.

6. The most marked evidence of excessive heating was observed by the farmers on the second and third days after the recession of the flood waters.

7. A clear-cut case of spontaneous ignition occurred near Middlesex, Vermont. This farm was in a narrow portion of the Winooski River Valley where the flood waters rose exceptionally high. The barn contained about 50 tons of meadow hay and a little alfalfa.

* Science, vol. LXVII, No. 1734, page 322.

The hay had been kept in a bay in the rear of the barn and rested upon boards laid flat on the ground. The contents of the bay consisted of:

About 2 feet of the previous year's hay (1926).

About 6 inches of first cutting alfalfa (1927), which had rotted somewhat in the field but which was dried before being stored in the barn.

About 45 feet of good meadow hay.

About 6 inches of good, second cutting alfalfa (1927).

About 6 inches of rowen on the top.

There was also a small pile of old dry straw on the barn floor.

The flood waters covered 17 feet of the pile of hay and most of the straw. No heating of the hay had been noticed before the flood, but considerable steaming was in evidence 24 hours after the waters had receded. The crest of the flood occurred early on Friday morning, November 4, 1927, and the barn burned between four and five o'clock on Monday afternoon, November 7, or about two days after the flood waters receded. On Sunday morning much heating had been noticed, and on Monday a distinctly charred odour was observed before the fire started. The barn burned to the ground and a silo, close by, fell over and was destroyed. It is interesting to note that the barn and hay stood in from three to five feet of water when the fire broke out.

In connection with the Vermont studies a number of farmers living near the Canadian border were visited. Several of these farmers claimed to have had marked success in stopping "spontaneous heating" of hay by the application of large quantities of salt. The urgent need for excessive research upon the problem of the "spontaneous heating" of farm products was emphasized by the lack of scientific knowledge with which to meet the situation in Vermont.

A Case of Spontaneous Ignition in Stable Manure

DEPARTMENT of Agriculture specialists have reported an observed case of spontaneous ignition in stable manure at the Arlington Experiment Farm at Rosslyn, Virginia*. Manure for fertilizer purposes had been hauled from a nearby cavalry station and placed on the farm grounds in an open plot. As the manure was unloaded the horses and wagons were driven over the pile and the load of manure was deposited on top. The custom had been to "cure" the manure from one to three years before spreading. The first loads had been deposited some two and a half years before and the mass had grown to a pile about 200 feet long, 50 feet wide, and from 1 to 20 feet high. Moderate heating of the manure had been accepted as an essential part of the curing although fire had not formerly occurred.

* Journal of Agricultural Research, vol. 36, No. 5, March 1, 1928, pages 481-485.

Before September 9, 1925, the date of the fire, the weather had been warm, ranging from 87° to 95° F. There had been no heavy rains for at least two weeks. Daily additions had been made to the pile, and although the mass was known to be excessively hot, the condition was not considered dangerous. Fire broke out during the night of September 9 and was discovered by the night watchman. The flames quickly spread over the entire west side of the pile. Water was applied from pails and the flames were extinguished. Within a few hours, however, fire again broke out along the same side of the mass.

The following afternoon, September 10, fire broke out on the opposite or east side of the pile. When this fire had been put out, an inspection of the stack revealed so many hot areas along the edges that the entire side was removed under frequent sprinkling with water. It was interesting to observe that when a forkful of material from one of the hot sections was removed and spread upon the ground, the straw was hot and steaming. About a minute later the steam changed to smoke, which increased in density until after about three minutes the material glowed a fiery red. Exactly the same conditions appeared in the stack adjacent to the spot from which the material had been removed.

This very definite observation, as well as many others of a similar type, indicates the possibility of spontaneous ignition of manure piles which may in some instances be closely related to unexplained barn fires.

Spontaneous Ignition in Hay Mows and Stacks in Canada

FIRE MARSHALL E. P. Heaton of Toronto, Ontario, has given considerable attention to the subject of spontaneous com-

bustion in barns and has issued several publications on this subject. In a three-year period, more than 400 barn fires in the Province of Ontario were investigated**. One hundred and eighty of these fires occurred in one season. In this investigation sufficient evidence was obtained to warrant the conclusion that "at least one-half of these fires have been directly and solely caused by spontaneous heating."

The conclusions by the Ontario Fire Marshal from this investigation of 400 barn fires are classified by him as follows:

1. Concerning the structure of the barn.
2. Concerning the farm crop.
3. Concerning farm machinery.
4. Concerning the character of the fires.

Concerning the barn structure.—The modern bank barn with close siding, frequently battened on the outside with inadequate gable and roof ventilation, contributes to spontaneous combustion. (This conclusion indicates the importance of adequate barn ventilation.)

Concerning the crop.—1. The present crops, now consisting largely of alfalfa and clover hays, cannot be properly cured and in condition to be housed, as was done in former days with crops which consisted principally of timothy.

2. Crops upon which rain has fallen should receive extra care, and should not be housed until thoroughly and completely dry.

3. After the crop is placed in the barn no water should be permitted to fall on it or be absorbed by it.

4. On account of lack of space, grain in the sheaf, baled hay, and straw are often put above the hay in the mows, pressing the hay and preventing the escape of vapors and gases.

5. The old-time custom of salting hay in the mow has largely disappeared. This is regarded as unfortunate as salting has been an accepted means for retarding combustion.

6. Stacks of hay or straw should never be built upon old footings, particularly when manure has been dumped thereon.

Concerning farm machinery.—1. New types of machinery for expediting the handling of the crops have been introduced.

2. The hay loader is frequently used to take up the crop from the windrows without cocking or coiling, which is regarded as an indefensible practice.

3. The speeding up of haying by the use of machinery necessarily results in imperfect curing and is favorable to spontaneous combustion.

Concerning fires.—1. Nearly every county in Ontario during the year in question (1921) had experienced many "mysterious fires" of this character.

2. Most of the barn fires occurred between 6 a. m. and 9:30 p. m. This is not regarded by the Fire Marshal as a favorable time for incendiary fires.

3. The months immediately following harvest or threshing are the ones in which most of the assumed "mysterious fires" occur.

The results of these investigations by the Fire Marshal of the Province of Ontario are a very valuable contribution to our knowledge on the subject and indicate that many of the 400 fires studied can be ascribed directly to the spontaneous ignition of hay.

Survey of Barn Fires in Pennsylvania

THE Pennsylvania State Bureau of Fire Protection, in cooperation with the Pennsylvania State College, made special studies of mysterious fires in that State*. The report of this survery states that "The farmer has been advised repeatedly as to the numerous fire hazards common to the farm, with but a single exception—spontaneous combustion. Spontaneous combustion has long been regarded as a marvelous and deeply mysterious phenomenon, something to be left strictly alone. The primary object of this survey was to bring light upon this subject and explain to the farmer the manner in which fires from this cause may be avoided."

The loss of farm property by fire in the State of Pennsylvania had increased from $2,796,871 in 1918 to $3,293,863 in 1924. In 1920 the farm fire loss in Pennsylvania represented 12.6 per cent of the total fire loss of the State. The value of all farm buildings, livestock, and machinery was put at 6.7 per cent of the total value of the property in that State which was subject to loss by fire. Eight hundred and forty-five barns were destroyed by fire in one year alone (1920).

In this special survery the studies were made of the barn fires in the large alfalfa-producing sections. Six definite cases of spontaneous ignition are reported, five of which occurred in first-cutting of clover and alfalfa hay, and one in second-growth clover and timothy. Cases were also found where the hay had ignited, but owing to lack of air, ignition and subsequent destruction of the barns were prevented.

Studies in Switzerland

AS THE result of a contest initiated by the Association of Cantonal Fire Insurance Companies in Switzerland, studies have been made on the spontaneous combustion of hay. The results of these studies have been published in detail by G. Laupper of Zuric under the title, "The Losses to Agriculture Resulting from the Spontaneous Combustion of Haystacks."** Laupper states that sixty years after the death of Curist, Pliny wrote "The cut hay must be turned about in the sun and should be dried when it is stacked. If this is not carefully observed a mist will be seen rising from it in the morning and it will soon be ignited by the sun and burn up." The statistics compiled in Switzerland by the Board of Directors of the Association of Cantonal Fire Insurance agencies resulted in the following conclusions:

1. That spontaneous combustion as the cause of fires is of far more frequency and covers a much wider territory than is generally supposed.

2. The fact needs to be widely known that we have to face a real calamity which deserves the closest attention of agriculturists.

These barn fires in Switzerland occurred in harvest season and declined as the winter season approached, which conditions are similar to those under which the fires of this character occurred in both Canada and the United States.

Control Measures

IN CONSIDERING this subject it is only natural to inquire as to what may be done to control fires of this kind. The research work now under way in the Department of Agriculture is being planned with a view to the development of practical measures. Special studies involving both chemical and bacteriological aspects of the problem have been undertaken

** Spontaneous Combustion in Hay Mows and Stacks, issued by Fire Marshal of Ontario, 1921.

* Survey of Farm Fires, by Bureau of Fire Protection, Pennsylvania State Police, Harrisburg, Pa., December, 1925.

** Materiaux pour l'etude des Calamities. July-September, 1926, pages 112-136.

(Continued on Page 31)

Severity of Building Fires

(Continued from Page 6)

with wood shelving. All tests with record storage were made on a cement finish floor. In the first tests most of the shelving was of the skeleton type without backs or partitions and while some reduction in the fire severity was obtained it was less than in the concluding tests with backed and partitioned shelving with doors on every third 3-foot section. A decided decrease in the tendency of fire to spread from small and large origins was noted although under conditions favorable for the building up of room temperature, fires involving the whole room and causing a complete burning-out of contents were obtained. The equivalent fire duration developed was about 35 per cent lower than in previous tests with an equal amount of records on wood shelving. The results of the tests with office and record storage occupancies have been published recently in greater detail than here given in Proceedings 14th (1928) Annual Meeting of the Building Officials Conference of America pp. 87-97; Quarterly of the National Fire Protection Association Vol. 22, No. 1, pp. 43-61, July 1928; Safety Engineering, August-September, 1928.

RESULTS of the tests described above are applicable to conditions in fire resistive buildings where floor, wall and column constructions can withstand a complete burning-out of contents without collapse and to buildings of protected combustible construction up to the limit of fire resistance of the protections applied. Extended to other occupancies and with materials having calorific values different from those for wood and paper, it is expected that information will be developed that will enable reliable estimates to be made of the severity of the fires that can arise with given amounts and character of contents. Since the majority of materials housed in buildings have calorific values and burning properties not far outside the range of those for wood and paper, the results of the tests made have application considerably beyond the occupancies represented in them. The work will enable public regulation of building construction to be placed on a more definite basis as it concerns fire resistance requirements, since the protection required can be made to correspond with the fire hazard present or to be expected from the construction and occupancy concerned.

The severity of fires in buildings of non-fire resistive construction is less determinate than in buildings where the structural integrity is maintained throughout the fire, on account of collapse of floors and roof and full or partial destruction of interior and exterior walls. The severity of such fires is of interest from the standpoint of exposure to insulated containers, such as safes and vaults, located within the building, to party and fire walls protecting adjoining buildings and the fire exposure to neighboring construction from radiated heat, hot air currents and flying brands. The severity of the initial portion of the fire before the interior construction collapses is measurable by the same means as previously described for fires in fire-resistive buildings. After collapse of non-fire resistive construction has taken place flaming and high air temperatures are confined to points immediately above the hot debris. The debris temperatures are, however, likely to remain at higher points for longer periods and the fire resistence of safes, vaults, party and fire walls covered or partly covered by the hot ruins may be severely taxed. In the tests in fire-resistive buildings described above, some insulated safes were introduced and temperatures on or a little above the floor under the heaps of glowing embers from furniture and paper were measured. While for the heavier concentrations of materials these indicated a somewhat more severe condition than the air temperatures, safes and vault doors would be seldom placed so as to receive the maximum exposure from them. In some tests, four-drawer wood filing cabinets were placed closely adjacent to safes without evidence of effects more severe than would be expected from the air temperatures within the room. In other tests where the hot debris from extra high cabinets partly covered the safes for a period after the fire they apparently received a more severe heat than could be attributed to the surrounding air temperatures. It would, however, be easily possible in almost all occupancies to so locate them as to avoid this higher hazard. In the case of non-fire resistive construction such precautions would be of little avail and the collapse of several floors would be expected to produce a more severe condition than the contents of a single floor.

THE indefinite and conflicting information on these points obtainable from building fires led to requests that tests representative of such fire conditions be included in our work. Through the courtesy of the Treasury Department two adjoining buildings, one two stories and the other five stories high, due to be razed in connection with the Government building program, were placed at our disposal. These were loaded with waste lumber to give superimposed floor loads of 7½ to 30 pounds per square foot for the different sections.* Thermocouples were located to measure both air and debris temperatures and as a further aid in gauging the severity of the fire conditions some 32 safes, most of which were donated by the manufacturers for the test, were distributed on the various floors. The fire, started at several points on the lower floor of each building, spread rapidly over the open joisted ceilings and through open elevator and stair shafts and nearly all portions of the two buildings were involved within 10 minutes. The temperature rise during the first part of the test was considerably more rapid than for the standard furnace test, 2000 F. being indicated for several points within 20 minutes and maximums between 2200 and 2400 F for a few points within 40 minutes after the start of the fire. The floor construction, consisting in most parts of 3-inch joists under a one inch single floor, began to burn through and collapse after 15 to 20 minutes, almost all safes above the ground floor falling in the period between 23 and 38 minutes. The masonry enclosing walls of the buildings began to fall at 28 minutes and at the end of the first hour most of the walls above the first story of the smaller building and above the second story of the 5-story building had collapsed. The walls almost invariably fell outward because of excessive outward deflection produced by the expansion on the side exposed to fire. One wall of the larger building fell over the small building burying the glowing contents and producing a prolonged heat exposure of which there was little direct evidence except for the temperature readings. After the first hour or two the air temperature above the debris fell rapidly and from this time on the exposure was mainly from the hot debris. Whether a safe became covered, partly covered or fell free of the hot debris was in considerable degree a matter of chance, hence the comparative performance of the safes was not obtained, those in some portions of the debris being subjected to a much

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*EDITOR'S NOTE—A portion of this data was given in a recent article by Dr. Ingberg published in the Journal, but is included here to make the present discussion complete.

Recent Mutual Meetings

Farm Companies' Conventions in Missouri and West Virginia

ON November 14th and 15th the Farmers County Mutual Fire Insurance companies of Missouri, held a state wide convention, which was attended by one hundred five delegates from fifty-four counties. The meeting convened at Mexico.

A get-to-gether banquet at Hotel Hoxsey and several sessions elsewhere brought out discussions of practical value to those attending. Prominent among the speakers were G. M. Peters, Henry Ziegenbaum, R. S. Withers, Elton L. Marshall and A. T. Grimes.

At the election of officers, Edgar Skinner of Bethany, vice president for the past year, was elected president to succeed Mr. Hook, president, during the past year. Mr. Skinner has been in Harrison County mutual insurance work since 1902, and is present secretary there.

B. L. Gillam of Clinton was elected vice president, Ben H. Lammers of Lockwood was elected secretary for the tenth year, and W. B. Flowers of Meadville was elected treasurer for the thirteenth year.

On joint invitation from Clay and Ray Counties the 1929 meeting will be held in Excelsior Springs.

The Farmers Mutual Re-insurance Company of Missouri officers elected include: W. P. Wade, LaMonte, president; G. W. Peters, Liberty, secretary-treasurer. Will Russell, Harrisonville, J. F. Summerville, Chillicothe, Ben H. Lammers, Lockwood, A. T. Grimes, Lees Summit, G. D. Shewey, Trimble, E. Steury, Springfield, were elected to the directorate.

WEST Virginia's Association of Mutual Fire Insurance Companies held its annual meeting at the Tore Hotel in Clarkesburg on November 20th.

Routine business during the morning session was supplemented by a talk on "Co-operation of Mutual Insurance Companies" in which the value of working together to build up prestige for the Mutual idea, was stressed.

At the afternoon meeting talks were given by Miss Larrick, representing the National Association of Mutual Insurance Companies—her theme being "The Fundamentals of Mutual Insurance" and by L. G. Wilson, Superintendent of Agents of the Municipal Insurance Co., who discussed the topic "Giving Service."

Officers elected were, C. D. Connoway of Fairmont, President; Blaine Engel, of Clarksburg, Vice-President, and J. A. Gist, of Wellsburg, Secretary-Treasurer.

Severity of Building Fires

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more severe fire condition than the others.

It might be noted that no water was applied during the test. After the first hour the fire could have been put out with little effort and this would normally have been done except in cases of crippled water supply, general conflagration or other unusual condition. The test, however, indicates the importance of quenching hot ruins even when they do not constitute a menace to the surroundings, as was particularly the case in this test for the smaller building that was blanketed by the fallen wall of the adjacent building.

No permanent building being nearer than 175 feet to those involved in the test, no apparent hazard to them was present under the conditions prevailing during the test, which were marked by absence of wind and flying brands. The latter condition is also attributable in part to the character of the contents consisting as they did mostly of materials not lighter than one inch boards. The sheet steel roof on the buildings functioned acceptably for a period preceding the collapse of roof framing, in preventing exit of flames and hot gases through the roof area thereby avoiding a too decided up-draft that might have carried brands. The co-operation of the District fire department was appreciated as a protection against possible exposure conditions, the severity of which could not be foreseen, and to allay the fears of owners of adjacent property. As far as known, no property damage whatsoever was caused by the test.

FULL results of the test are being prepared for publication in an early number of the Bureau of Standards Journal of Research. They will detail for the first time conditions obtaining when buildings of this type are destroyed under conditions approaching those of a conflagration.

Of other matters on which some information was obtained in these tests that is less directly related to their general object, reference can be made to the rate of spread of fire and possibility of extinguishment if rapid spread noted in the last test detected in its early stages. The rapid spread noted in the last test would have been greatly retarded by incombustible finishes on ceilings and partitions and by enclosure of stair and elevator shafts. In fire resistive rooms, and from analogy, in those with fire resistive interior finishes, the initial spread of fire from small origins is quite slow where only the ordinary combustible materials are present and there is apparently inherent in many situations ample scope for effectiveness of fire detective and minor fire extinguishing appliances. To produce rapid spread, room temperatures must be built up equalling or exceeding the ignition points of the materials concerned. From this point on the fire passes rapidly into stages where extinguishment or other control becomes increasingly difficult.

Little Known Coverages

(Continued from Page 10)

soon spread to the continent of Europe, particularly to France, Germany, and Italy. It was in 1866 that the Hartford Steam Boiler Inspection and Insurance Company was formed —the first company in America, it is said, to write steam boiler insurance. In Canada, the first company in the field is reported to have been the Boiler Inspection and Insurance Company of Canada, organized in 1875. The Hartford company, mentioned above, is said to be the largest in the world in the field of steam boiler insurance, and its activities have been extended to include power plant insurance in many other lines than steam boilers, including among others, engine, fly-wheel, and electrical machinery insurance. It also provides, when desired, consequential damage and use and occupancy coverage on the various lines of insurance which it writes. The Hartford Company is now the owner, it is said, of the Boiler Inspection and Insurance Company of Canada.

There are in all over twenty insurance companies selling steam boiler insurance in the United States. The Insurance Year Book for 1926 re-

ports twenty-two companies operating in New York State, twenty-three in Massachusetts, and twenty-two in Illinois. In a recent year, the premiums received by steam boiler insurance companies were reported to have been $6,140,000 and the losses paid a little over $1,000,000.

Although the coverage given by steam boiler insurance companies has long resisted standardization, it may be said, in general, that the policy provides for indemnity to the insured for direct loss or damage for boiler explosion, both to the insured's property and to that of others. It also includes indemnity for personal injury or death resulting from the explosion. Moreover, if the operations of the plant are either seriously crippled or completely suspended as a result of the explosion, indemnity may be secured for loss of income or profits if the insured has seen to it that the policy includes this form of coverage.

ONE of the outstanding features of the insurance companies that assume steam boiler risks is the inspection service rendered to the insured. The names of certain companies in this particular line of insurance at times indicates the importance of inspection. The Hartford company referred to above, it will be observed, includes in its name the word "Inspection"; the same is true of the Canadian company noted above; and the first British company in the field—the Steam Boiler Assurance Company of Manchester, England—absorbed, in the year after its formation, the "Huddersfield Association for the Prevention of Steam Boiler Explosions," an organization that had been formed a few years before the birth of the Steam Boiler Assurance Company of Manchester. The fundamental idea back of the inspection service is that every possible effort should be exerted to prevent explosions in-so-far as this is humanly possible. Hence the high-grade inspection service provided by companies that are in the steam boiler insurance field.

Engine Breakage Insurance

ENGINE Breakage Insurance is a relatively new form of power plant insurance. More correctly, it is the name given to that type of coverage which includes, not only that formerly contained in the so-called fly-wheel policy, but the coverage has been extended to the breaking down of the engine as well. The more comprehensive policy has been used in this country probably not more than eight or ten years. It did not supplant the old policy, inasmuch as fly-wheel insurance coverage alone still continues to be written.

Fly-wheel insurance is said to have been made available to prospective buyers of this form of coverage in 1901, but it was not until five years later that data was made public as to the development of this line of business. By 1910, eight American companies offered fly-wheel coverage with premium receipt, from this department of their business, of about $173,000. At the present time, a considerable number of casualty companies offer either fly-wheel or the broader engine breakage coverage.

A fly-wheel policy undertakes to grant indemnity for direct loss or damage to the insured's property and the property of others as well, when the cause of such loss or damage is the "explosion, bursting, or breaking of a fly-wheel." Moreover, the coverage includes death and injury incurred as a result of the accident. Public liability for the accident may also be written into the policy for a proper consideration. Additional coverage also may be had extending to the loss of profits or income because of the plant being so injured or destroyed by the accident as to make its continued operation impracticable.

In the engine breakage policy the fly-wheel continued to be covered, it being regarded as a part of the engine. Consequently, the newer form of policy includes the coverage granted by the issuing company under the older policy form with the addition of the coverage for the breakdown of the engine itself. In the interest of preventing accidents wherever possible, it is virtually a uniform practice for the insurance companies writing engine breakage insurance to render their policyholders an inspection service. This, of course, was and is the plan in connection with fly-wheel insurance.

The hazard with which fly-wheel or engine breakage insurance is concerned is one resulting from mechanical invention and the operation of machinery. Only those who possess a knowledge of power-plant engineering are able to understand fully the nature of the hazard here under consideration, and only the technically-trained are capable of comprehending the details of the computations and the fine points of policy conditions. It is said, however, that engine breakage insurance is successfully solicited and written, with the intelligent use of data furnished from the home office, by agents who have had no technical engineering training whatsoever.

Odd Disasters

(Continued from Page 23)

dent, but a study of the general drawings showed an important variation in the actual installation, in that the six C trusses were supported on separate plate and angle columns four feet high instead of one foot, nine inches high, as called for in the design drawings. The bases of these four-foot posts were embedded in a few inches of concrete but were not bolted or otherwise properly anchored to the building frame.

CAUSE OF THE FAILURE

A number of weaknesses apparently existed which together contributed to the collapse. The greatest force due to the wind coming from the west would fall upon the southeast B truss at the point where the A truss connects. The violent gusts from this particular direction produced high bending stresses in the upper chord of the B truss, and that member was not properly designed to resist them. The high 4-foot posts and the lack of anchorage noted above would then be further factors in the collapse. The structure also had general flexibility and lacked stiffness to prevent swaying, so that violent gusts approximating the natural period of sway would set up heavy forces which the structure might have been unable to resist.

LESSONS

Design tank structures properly to resist high-wind velocities which may occur occasionally in almost any location. Tank and towers erected in accordance with Factory Mutual specifications are able to withstand winds of hurricane velocity.

Anchor tank structures adequately. Tanks over buildings should have anchorage sufficient to resist 150 per cent of the maximum net uplift with a one-hundred-mile wind blowing against the empty tank.

Little Jimmie—"I saw you kiss my sister!"

Boy friend—"Here's a quarter. Forget it."

Little Jimmie—"And here's fifteen cents change. One price to all. That's the way I do business."

Farm Fires

(Continued from Page 27)

and experimental work on a practical basis has been planned.

In a special leaflet entitled "Preventing Farm Fires," the Farm Fire Protection Committee of the National Fire Protection Association makes the following recommendations for the prevention of fires from spontaneous ignition:

"Thoroughly cure hay, pea vines and other roughage, before these are stacked in barns. Do not allow horse manure to accumulate in large piles in stables or against buildings. Where slightly damp hay is stored, a sprinkling of salt is useful to retard fermentation. Use from three to ten pounds of salt per ton of hay, according to its dampness.

"Uncured hay continues to live for some time after it is cut, and heats when stacked in large piles. Also, the fermentation of bacteria, yeasts and molds, which increase rapidly in horse manure, uncured hay, green pea vines and other damp roughage, generates heat, which accumulates at the center of a heavy mass of these materials, eventually to an extent such that the small amount of air that filters into the pile can cause ignition."

Importance of Cooperation

IN THIS research work on the spontaneous heating or self-ignition of agricultural products the Chemical Engineering Division of the Bureau of Chemistry and Soils solicits the cooperation of the farm associations, insurance organizations, and all interested agencies. It will be helpful for the Bureau to receive prompt reports of fires of this character, together with a record of any direct experiences in connection with this important subject, about which more knowledge must be acquired before effective control measures can be devised. The problem of spontaneous ignition not only is related to farm products but extends into practically all lines of industry, and results in extensive economic losses. It is a problem of national importance and one that justifies thorough scientific research.

Editorial

(Continued from Page 14)

eration which the latest of these small pilgrims represents will not merely sing of the Bethlehem star, but will follow it—follow it with a fidelity which we have not shown. And perhaps the dream of "Peace on Earth, Goodwill among Men" will become a reality. For surely this Christmas story could not have lived so long and spread so far over our world were it not that it holds the message of God's loving purpose for mankind—the purpose that at last must be fulfilled.

It is with this confidence that the Journal of American Insurance, putting aside all thoughts of business on the eve of the great festival, extends to its many readers the heartiest wishes for a joyful Christmas.

New York Meeting

At the meeting of the Board of Commissioners of the American Mutual Alliance held at the Astor Hotel in New York City on December 10th Mr. C. E. Hodges, Jr. of Boston was elected Chairman of the Board for the ensuing year, succeeding Mr. Burton S. Flagg of Andover, Massachussets.

Bits of Wit

"But I am sure you have the book," the girl insisted. Suddenly she opened her handbag and produced a slip of paper on which something was written. Then she blushed. "Oh, I beg your pardon," she said, "it's 'The Ruby Yacht,' by a man named Omar, I want."

—*Boston Transcript.*

"Lady," said Mike, "would you lend me a cake of soap?"

"Do you mean to tell me you want soap?"

"Yes'm. Me partner's got de hiccups an' I want to scare him."

"Captain," inquired the curious old lady, "what causes all the commotion in the water behind the ship?"

"The screw, madam," replied the doughty seaman.

"What makes the screw turn?" the pert old thing asked.

"The engineer does it with his screwdriver," snickered the old sea dog, as he staggered aft.

Visiting M. D.: Farmer Brown, I'm afraid I can't come out to see you any more.

Farmer (worried): Why, what's the matter, Doctor?

M. D.: Why, every single time I come out your ducks insult me.

"Any part of the city you want, cheapest rates!" yelled the taxi driver.

"You can't string me again. I bought the city hall last year, and they wouldn't give it to me."

We once knew a Scotchman who would never smoke cigarettes when he had gloves on. He said he hated the smell of burning leather.

Then there's the Scotch sheik who gave his sweetie moth balls to put in her hope chest.—Judge.

Wife—Where have you been so late?

Hubby—Stop me if you've heard this one.

—Northern Daily Telegraph.

Wife—You think so much of your poker that you don't even remember the day we were married.

Hubby—I do. It was the day after I held that straight flush at the club.

—Everybody's Weekly.

All at Sea

A girl at a public library inquired it "the Red Boat" was in.

"I don't think we have the book," she was told.

"Oh, excuse me," said the girl. "I made a mistake. The title is 'The Scarlet Launch.'"

After a search the library assistant reported that no book with that title was listed in the card catalog.

Auto-tourist: I clearly had the right of way when this man ran into me, and yet you say I am at fault.

Local Cop: You certainly were.

Autoist: Why?

Local Cop: Because his father is Mayor, his brother is Chief of Police and I keep company with his sister.

The Threshold of Saving

Mutual Insurance

Mutual Insurance involves more than a return of that portion of premiums which is not required for the payment of losses, operating expenses, and for the accumulation of reserves. - - - - -

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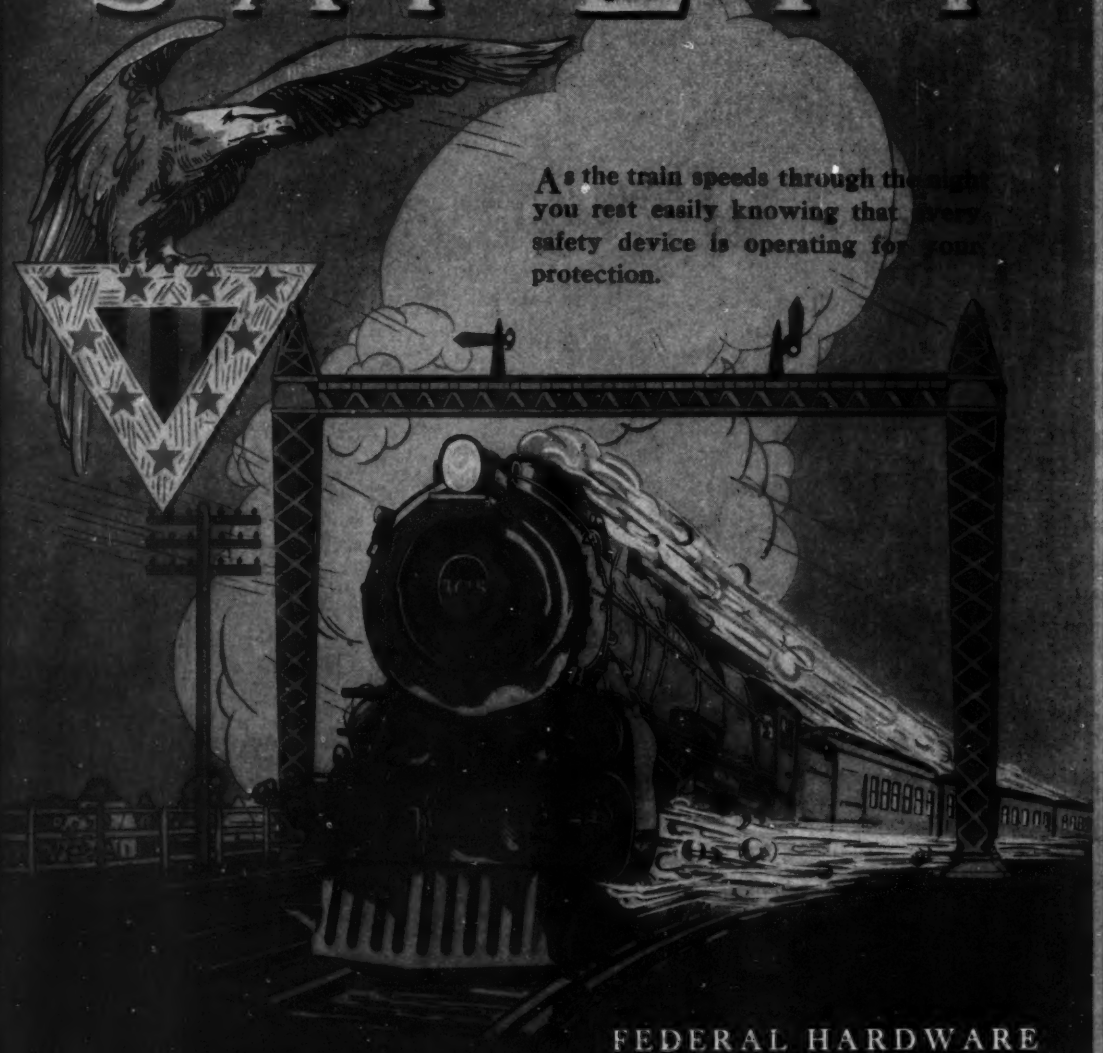
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"L-M-C" policyholders profit by a nation-wide service. There are branch offices in 31 cities and claim representatives in practically all cities of importance.

* * *

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